

# Washington Water Supply Outlook Report March 1, 2009



# Water Supply Outlook Reports and Federal - State – Private Cooperative Snow Surveys

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## *How forecasts are made*

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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# Washington Water Supply Outlook

March 2009

## General Outlook

The roller coaster ride continues so “A day late and dollar short” is this month’s mantra. March precipitation was at best on the bleak side, providing just enough mountain snow to maintain close to March 1 averages. With 85 percent of the season gone there is only precious time left to buffer a mostly lacking snowpack this season. Fortunately the Climate Prediction Center is forecasting below average temperatures for the next several months. However long range precipitation forecasts aren’t nearly as decisive providing equal chances of below, above or near average rainfall. Central Puget Sound basins remain the highest with near to above average snowpack. The Okanogan area continues to drag behind at much below average. Streamflow forecasts remain within a reasonable range of 60-98% of average for spring and summer runoff.

## Snowpack

The March 1 statewide SNOTEL readings were 75% of average, down slightly from last month. The Conconully Lake area snow surveys reported the lowest readings at 41% of average. The Tolt river Basin is the only basin to remain above average at 125%. Westside averages from SNOTEL, and March 1 snow surveys, included the North Puget Sound river basins with 68% of average, the Central Puget river basins with 102%, and the Lewis-Cowlitz basins with 84% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 70% and the Wenatchee area with 60%. Snowpack in the Spokane River Basin was at 82% and the Walla Walla River Basin had 92% of average. Maximum snow cover in Washington was at Paradise SNOTEL near Mt. Rainer, with water content of 48.2 inches. Last year at this time Paradise had 77.4 inches of snow water. The highest average in the state was at Huckleberry SNOTEL with 472% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane .....	62 .....	82
Newman Lake .....	63 .....	84
Pend Oreille .....	77 .....	84
Okanogan .....	57 .....	56
Methow .....	59 .....	60
Conconully Lake .....	43 .....	41
Wenatchee .....	60 .....	63
Chelan .....	64 .....	62
Upper Yakima .....	51 .....	66
Lower Yakima .....	63 .....	74
Ahtanum Creek .....	71 .....	77
Walla Walla .....	68 .....	92
Lower Snake .....	65 .....	79
Cowlitz .....	60 .....	88
Lewis .....	51 .....	81
White .....	61 .....	74
Green .....	63 .....	95
Puyallup .....	64 .....	87
Cedar .....	46 .....	96
Tolt .....	58 .....	125
Snoqualmie .....	53 .....	94
Skykomish .....	57 .....	91
Skagit .....	61 .....	68
Baker .....	54 .....	70
Nooksack .....	49 .....	67
Olympic Peninsula .....	37 .....	51

## Precipitation

During the month of January, the National Weather Service and Natural Resources Conservation Service climate stations reported well below average precipitation totals throughout Washington river basins. The highest percent of average in the state was at Spokane which reported 80% of average for a total of 1.21 inches. The average for Spokane is 1.51 inches for January. The wettest spot in the state was reported at June Lake SNOTEL with a January accumulation of only 7 inches, 30% of normal. Scattered storms during the final week of March helped lift averages above an even deeper recession. The Central Puget Sound basin is the only area to retain above average precipitation for the water year.

RIVER BASIN	JANUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane .....	66 .....	88
Pend Oreille .....	55 .....	73
Upper Columbia .....	43 .....	66
Central Columbia .....	28 .....	83
Upper Yakima .....	26 .....	95
Lower Yakima .....	35 .....	89
Walla Walla .....	44 .....	97
Lower Snake .....	47 .....	94
Lower Columbia .....	33 .....	80
South Puget Sound .....	33 .....	90
Central Puget Sound .....	33 .....	104
North Puget Sound .....	30 .....	81
Olympic Peninsula .....	32 .....	80

## Reservoir

Seasonal reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. Reservoir storage in the Yakima Basin was 655,000-acre feet, 131% of average for the Upper Reaches and 152,000-acre feet or 110% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 88% of average for March 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 90,000 acre feet, 62% of average and 38% of capacity; Chelan Lake, 273,000-acre feet, 109% of average and 40% of capacity; and the Skagit River reservoirs at 110% of average and 67% of capacity. Current climate impacts and management procedures may change these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane .....	38 .....	62
Pend Oreille .....	30 .....	61
Upper Columbia .....	64 .....	88
Central Columbia .....	40 .....	109
Upper Yakima .....	79 .....	131
Lower Yakima .....	66 .....	110
Lower Snake .....	66 .....	102
North Puget Sound .....	67 .....	110

## Streamflow

Forecasts vary from 98% of average for the White River near Buckley to 60% of average for Okanogan River. April-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 95%; White River, 98%; and Skagit River, 79%. Some Eastern Washington streams include the Yakima River near Parker, 76%; Wenatchee River at Plain, 72%; and Spokane River near Post Falls, 83%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be followed when using early season forecasts for critical water resource management decisions since conditions can change rapidly.

Statewide January streamflows were all much below average due to the lack of precipitation through the majority of the month of March. The Methow River at Pateros had the highest reported flows with 98% of average. The Columbia River at Birchbank with 34% of average was the lowest in the state. Other streamflows were the following percentage of average as reported by the River Forecast Center: the Cowlitz at Castle Rock, 46%; the Spokane at Spokane, 54%; the Columbia below Rock Island Dam, 62%; and the Cle Elum near Roslyn, 41%.

BASIN	PERCENT OF AVERAGE ( 50 PERCENT CHANCE OF EXCEEDENCE )
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Spokane .....	75-85
Pend Oreille .....	85-88
Upper Columbia .....	60-90
Central Columbia .....	69-77
Upper Yakima .....	70-76
Lower Yakima .....	76-84
Walla Walla .....	93-94
Lower Snake .....	75-87
Lower Columbia .....	85-92
South Puget Sound .....	90-98
Central Puget Sound .....	93-95
North Puget Sound .....	77-80
Olympic Peninsula .....	72-78

STREAM	PERCENT OF AVERAGE JANUARY STREAMFLOWS
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Pend Oreille Below Box Canyon .....	63
Kettle at Laurier .....	66
Columbia at Birchbank .....	34
Spokane at Long Lake .....	53
Similkameen at Nighthawk .....	63
Okanogan at Tonasket .....	49
Methow at Pateros .....	98
Chelan at Chelan .....	64
Wenatchee at Pashastin .....	62
Yakima at Cle Elum .....	41
Yakima at Parker .....	44
Naches at Naches .....	55
Grande Ronde at Troy .....	48
Snake below Lower Granite Dam .....	57
SF Walla Walla near Milton Freewater .....	64
Columbia River at The Dalles .....	61
Lewis at Ariel .....	36
Cowlitz below Mayfield Dam .....	55
Skagit at Concrete .....	53
Dungeness near Sequim .....	37

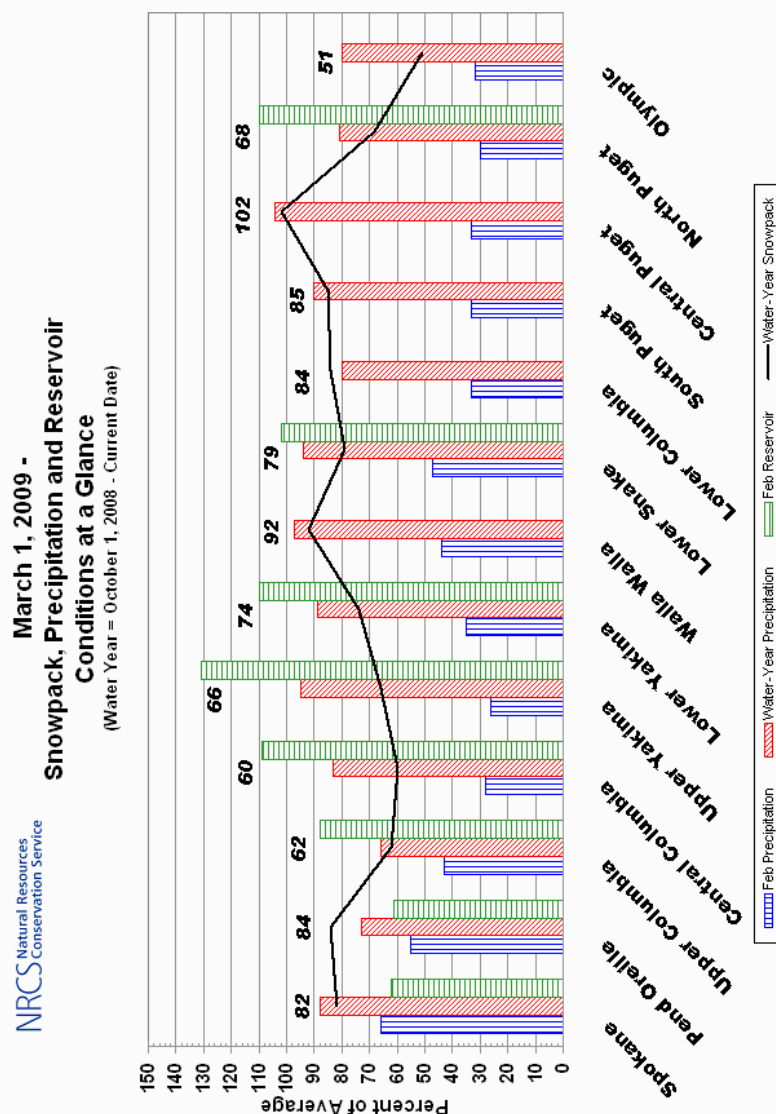
*For more information contact your local Natural Resources Conservation Service office.*

# BASIN SUMMARY OF SNOW COURSE DATA

MARCH 2009

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
AHTANUM R.S.	3100	2/26/09	12	3.7	5.8	7.0	JASPER PASS	AM 5400	2/27/09	108	42.0	81.9	74.0
ALPINE MEADOWS	3500	2/27/09	94	36.0	68.0	33.8	JUNE LAKE	SNOTEL 3440	3/01/09	80	33.1	70.0	33.9
ALPINE MEADOWS SNTL	3500	3/01/09	91	41.2	68.0	36.5	KELLER RIDGE	3700	2/25/09	18	4.2	6.3	--
AMBROSE	6480	2/26/09	47	10.8	11.9	10.5	KISHENEHN	3890	2/28/09	26	6.6	10.2	7.3
ASHLEY DIVIDE	4820	2/26/09	29	7.0	8.3	6.2	KIT CARSON PASTURE	4950	2/25/09	26	8.4	7.7	8.2
BADGER PASS SNOTEL	6900	3/01/09	67	19.7	32.5	29.7	KRAFT CREEK SNOTEL	4750	3/01/09	39	11.8	12.2	13.6
BARRE MIDWAY	4600	2/23/09	51	17.9	38.3	28.7	LAMB BUTTE		2/27/09	31	7.4	14.3	--
BARRE TRAIL	3800	2/23/09	26	8.1	18.3	8.2	LESTER CREEK	3100	2/25/09	44	18.8	28.0	17.2
BARKER LAKES SNOTEL	8250	3/01/09	48	12.2	10.9	11.1	LOGAN CREEK	4300	2/24/09	24	7.2	14.1	6.2
BASIN CREEK SNOTEL	7180	3/01/09	22	5.3	5.2	6.1	LOLO PASS	SNOTEL 5240	3/01/09	70	22.3	31.6	26.8
BASSOO PEAK	5150	2/23/09	26	8.4	13.4	9.0	LONE PINE	SNOTEL 3930	3/01/09	67	25.6	54.1	31.7
BEAVER CREEK TRAIL	2200	3/04/09	34	12.2	27.6	13.0	LOOKOUT	SNOTEL 5140	3/01/09	69	20.2	31.1	27.2
BEAVER PASS	3680	3/04/09	48	18.3	32.9	24.9	LOST HORSE	SNOTEL 5120	3/01/09	42	12.6	17.9	18.3
BEAVER PASS SNOTEL	3630	3/01/09	65	21.8	38.9	33.9	LOST LAKE	SNOTEL 6110	3/01/09	---	40.3	50.7	50.7
BLACK PINE SNOTEL	7100	3/01/09	40	10.9	10.9	10.1	LOUP LOUP CAMPGROUND		2/20/09	13	2.3	7.3	--
BLUEWETT PASS#2SNOTEL	4240	3/01/09	30	10.5	20.3	15.7	LOWER SANDS CREEK #2	3120	3/03/09	---	15.0E	29.8	16.6
BLUE LAKE	5900	2/23/09	40	12.4	21.2	21.1	LUBRECHT FOREST NO 3	5450	2/27/09	19	4.7	6.0	5.6
BROWN TOP	AM 6000	3/03/09	104	35.6	55.6	53.4	LUBRECHT FOREST NO 4	4650	2/27/09	11	2.8	2.4	2.7
BROWNS PASS		3/03/09	20	5.3	4.5	--	LUBRECHT FOREST NO 6	4040	2/27/09	11	3.0	2.9	3.2
BRUSH CREEK TIMBER	5000	2/24/09	38	11.5	10.7	7.5	LUBRECHT HYDROPLOT	4200	2/26/09	17	4.1	5.1	5.1
BULL MOUNTAIN	6600	2/27/09	18	4.8	4.7	5.1	LUBRECHT SNOTEL	4680	3/01/09	18	5.2	5.2	5.3
BUMPING RIDGE SNOTEL	4610	3/01/09	72	22.6	31.2	24.9	LYNNA LAKE	SNOTEL 5980	3/01/09	106	33.6	47.3	55.1
BUNCHGRASS MDWSNOTEL	5000	3/01/09	63	17.6	25.3	24.4	LYNN LAKE	4000	2/25/09	60	25.2	40.3	16.1
BURNT MOUNTAIN PIL	4170	3/01/09	52	20.5	33.0	13.4	MARIAS PASS	5250	2/25/09	40	11.0	17.9	14.9
BUTTERMILK BUTTE	5250	2/26/09	33	7.9	12.4	--	MARTEN LAKE	AM 3600	2/27/09	122	45.0	84.6	61.9
CAYUSE PASS SNOTEL	5240	3/01/09	100	30.9	57.4	--	MARTEN RIDGE SNOTEL	3520	3/01/09	89	44.0	65.1	--
CHAMOKANE 2	3520	2/28/09	21	5.7	9.4	--	MAZAMA		2/20/09	20	4.3	11.2	--
CHESSMAN RESERVOIR	6200	2/23/09	12	2.6	3.6	3.1	MEADOWS CABIN	1900	3/04/09	18	6.9	13.5	5.5
CHICKEN CREEK	4060	2/25/09	41	12.5	19.5	14.4	MEADOWS PASS	SNOTEL 3230	3/01/09	55	21.3	53.7	19.8
CITY CABIN	2390	2/27/09	34	13.0	20.5	10.2	METEOR		2/24/09	22	6.1	8.1	--
COLD CREEK STRIP	6020	2/23/09	20	4.3	7.6	--	M F NOOKSACK	SNOTEL 4970	3/01/09	88	36.5	--	--
COMBINATION SNOTEL	5600	3/01/09	20	4.2	6.0	4.5	MICA CREEK	SNOTEL 4510	3/01/09	60	19.2	29.5	23.2
COPPER BOTTOM SNOTEL	5200	3/01/09	27	6.6	9.0	9.9	MINERAL CREEK	4000	2/25/09	45	10.8	19.4	15.8
COPPER CREEK	5700	2/23/09	25	8.6	10.7	12.5	MINERS RIDGE	SNOTEL 6110	3/01/09	112	34.6	43.6	45.2
COPPER MOUNTAIN	7700	2/24/09	31	8.0	7.5	8.9	MISSION RIDGE	5000	2/26/09	31	8.7	16.3	15.2
CORNER CREEK	3150	3/03/09	---	7.0E	16.0	6.7	MORSE LAKE	SNOTEL 5410	3/01/09	85	26.0	50.8	47.0
CORRAL PASS	5800	3/01/09	64	23.5	32.4	29.5	MOSES MOUNTAIN (2)	4800	2/27/09	28	6.8	13.2	17.5
COTTONWOOD CREEK	6400	2/25/09	18	4.5	4.9	6.0	MOSES MTN	SNOTEL 5010	3/01/09	28	6.6	10.1	13.4
COUGAR MTN. SNOTEL	3200	3/01/09	38	15.2	34.4	17.1	MOSES PEAK	6650	2/27/09	37	10.3	18.6	11.7
COX VALLEY	4500	2/27/09	58	15.9	43.6	31.7	MOSQUITO RDG	SNOTEL 5200	3/01/09	---	21.2	34.4	31.1
COYOTE HILL	4200	2/25/09	28	9.2	10.0	9.1	MOULTON RESERVOIR	6850	2/27/09	27	4.8	6.4	6.2
DALY CREEK SNOTEL	5780	3/01/09	36	8.7	11.6	9.4	MOUNT BLUM	AM 5800	2/27/09	88	34.0	56.8	54.1
DEER PARK	5200	2/24/09	23	9.6	25.1	15.1	MOUNT CRAG	SNOTEL 3960	3/01/09	38	11.2	31.3	26.8
DESERT MOUNTAIN	5600	2/23/09	62	10.1	13.9	12.6	MOUNT TOLMAN	2000	2/24/09	10	3.4	4.6	3.3
DEVILS PARK	5900	3/04/09	79	28.6	38.7	37.9	MOWICH	SNOTEL 3160	3/01/09	7	2.8	5.8	1.5
DISAUTEL PASS		3/03/09	18	4.9	7.0	--	MOUNT GARDNER	3300	2/27/09	59	14.0	32.5	13.0
DISCOVERY BASIN	7050	2/24/09	31	7.8	7.2	8.4	MOUNT GARDNER SNOTEL	2920	3/01/09	---	14.8	30.7	14.1
DIX HILL	6400	3/01/09	35	10.5	10.2	10.0	MUTTON CREEK #1	5700	2/27/09	27	5.1	12.8	12.0
DOCK BUTTE	AM 3800	2/27/09	102	38.0	74.4	52.6	N.F. ELK CR SNOTEL	6250	3/01/09	35	9.2	8.9	10.2
DOMMERIE FLATS	2200	3/04/09	13	7.1	12.6	7.2	NEVADA RIDGE SNOTEL	7020	3/01/09	45	12.3	13.3	13.2
DUNCAN RIDGE	5370	2/23/09	13	2.3	6.8	--	NEW HOZOMEEN LAKE	2800	3/03/09	23	7.3	14.7	10.3
DUNGENESS	SNOTEL 4010	3/01/09	13	3.8	13.2	8.9	NEZ PERCE CMP SNOTEL	5650	3/01/09	42	11.5	13.7	12.7
EAST FORK R.S.	5400	2/23/09	20	5.4	5.9	5.6	NEZ PERCE PASS	6570	2/25/09	41	13.5	15.1	15.7
EASY PASS	AM 5200	2/27/09	84	35.0	68.0	65.1	NOISY BASIN SNOTEL	6040	3/01/09	103	30.8	30.8	33.8
EL DORADO MINE	7800	2/23/09	73	2.7	8.8	15.8	OLALLIE MDWS	SNOTEL 4030	3/01/09	75	30.6	68.0	48.9
ELBOW LAKE	SNOTEL 3200	3/01/09	72	24.1	51.6	34.3	OPHIR PARK	7150	3/01/09	36	14.4	10.3	14.1
EMERY CREEK SNOTEL	4350	3/01/09	46	12.8	14.9	13.3	PARADISE SNOTEL	5130	3/01/09	122	48.2	77.4	59.7
FATTY CREEK	5500	2/28/09	61	17.4	18.6	20.4	PARK CK RIDGE SNOTEL	4600	3/01/09	63	22.9	49.0	44.1
FISH CREEK	8000	2/27/09	30	7.3	7.6	7.8	PETERSON MDW	SNOTEL 7200	3/01/09	35	8.1	7.0	7.8
FISH LAKE	3370	3/02/09	58	21.8	38.8	29.9	PIGTAIL PEAK	SNOTEL 5800	3/01/09	108	43.5	53.6	44.6
FISH LAKE	SNOTEL 3430	3/01/09	57	19.8	35.2	30.6	PIKE CREEK SNOTEL	5930	3/01/09	86	19.3	24.5	22.8
FLATTOP MTN SNOTEL	6300	3/01/09	97	26.8	42.6	39.2	PIPESTONE PASS	7200	2/24/09	11	2.2	3.1	4.1
FLEECER RIDGE	7500	2/27/09	27	6.8	9.2	9.2	POPE RIDGE	SNOTEL 3590	3/01/09	36	10.3	18.2	18.5
FOURTH OF JULY SUM	3200	2/25/09	27	8.4	16.0	8.2	POTATO HILL	SNOTEL 4510	3/01/09	77	20.4	37.6	23.6
FREEZEOUT CK. TRAIL	3500	3/03/09	26	9.0	15.4	11.3	QUARTZ PEAK	SNOTEL 4700	3/01/09	48	16.4	26.0	19.5
FROHNER MDWS SNOTEL	6480	3/01/09	26	5.6	6.1	6.3	RAGGED MOUNTAIN	4200	3/01/09	52	18.4	29.4	17.5
GOLD MTN LOOKOUT		2/25/09	27	7.3	11.8	--	RAGGED MTN SNOTEL	4210	3/01/09	50	18.2	29.5	--
GRASS MOUNTAIN #2	2900	2/25/09	24	13.7	21.0	9.8	RAINY PASS	SNOTEL 4890	3/01/09	63	21.6	31.9	38.2
GRAVE CRK SNOTEL	4300	3/01/09	38	11.4	16.5	14.5	RAINY PASS	4780	3/02/09	66	21.7	37.1	33.8
GREEN LAKE	SNOTEL 5920	3/01/09	57	18.5	25.1	19.7	REX RIVER	SNOTEL 3810	3/01/09	68	24.9	62.2	23.9
GRIFFIN CR DIVIDE	5150	2/23/09	28	9.8	11.7	9.5	ROCKER PEAK SNOTEL	8000	3/01/09	49	12.9	9.7	11.2
GROUSE CAMP	SNOTEL 5390	3/01/09	42	12.5	18.6	17.6	ROCKY CREEK	AM 2100	2/27/09	105	34.0	50.0	26.5
GUNSIGHT LAKE	6300	2/23/09	74	27.2	--	--	ROLAND SUMMIT	5120	2/27/09	78	25.0	41.5	29.2
HAND CREEK SNOTEL	5030	3/01/09	42	11.8	11.4	9.9	ROUND TOP MTN	4020	2/27/09	41	12.8	20.4	--
HARTS PASS	SNOTEL 6490	3/01/09	70	23.9	35.5	39.7	RUSTY CREEK	4000	2/27/09	13	2.4	5.8	6.2
HARTS PASS	6500	3/02/09	77	26.3	40.2	36.8	SF THUNDER CK	AM 2200	2/27/09	36	13.0	28.4	8.0
HELL ROARING DIVIDE	5770	2/27/09	74	23.6	30.4	25.8	SADDLE MTN SNOTEL	7900	3/01/09	66	18.9	25.1	21.8
HERRIG JUNCTION	4850	2/23/09	54	17.2	25.6	22.2	SALMON MDWS	SNOTEL 4460	3/01/09	20	4.1	8.6	10.1
HIGH RIDGE	SNOTEL 4920	3/01/09	62	21.0	30.4	21.2	SASSE RIDGE	SNOTEL 4340	3/01/09	58	15.9	36.3	30.3
HOLBROOK	4530	3/02/09	34	9.8	9.1	8.3	SATUS PASS	4030	2/24/09	38	12.2	22.6	9.6
HOODOO BASIN SNOTEL	6050	3/01/09	92	29.0	43.0	38.6	SAVAGE PASS	SNOTEL 6170	3/01/09	65	19.6	27.4	22.5
HUCKLEBERRY	SNOTEL 2250	3/01/09	21	8.5	4.9	1.8	SAWMILL RIDGE	4700	2/25/09	59	22.5	32.7	28.6
HUMBOLDT GLCH SNOTEL	4250	3/01/09	---	10.8	20.6	11.7	SAWMILL RIDGE SNOTEL	4640	3/01/09	92	36.1	49.6	--
HURRICANE	4500	2/27/09	24	6.5	--	15.6	SCHREIBERS MDW	AM 3400	2/27/09	84	31.0	61.8	43.5
INTERGUARD	6450	2/23/09	17	3.6	4.2	6.2	SENTINEL BT SNOTEL	4680	3/01/09	31	6.1	6.3	--
IRENE'S CAMP	5530	2/23/09	22	5.1	9.3	--	SHEEP CANYON	SNOTEL 3990	3/01/09	74	29.4	59.0	31.6

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1971-00
SHERWIN SNOTEL	3200	3/01/09	---	9.3	15.2	10.8	THUNDER BASIN SNOTEL	4320	3/01/09	42	14.7	32.2	29.7
SKALKAHO SNOTEL	7260	3/01/09	62	16.9	22.5	20.2	THOMPSON CREEK	2500	2/27/09	24	7.3	11.3	--
SKOOKUM CREEK SNOTEL	3310	3/01/09	69	34.3	57.6	18.9	THOMPSON RIDGE	4650	2/26/09	27	5.9	11.7	--
SKOOKUM LAKES	4230	3/02/09	32	11.2	19.4	--	TINKHAM CREEK SNOTEL	2990	3/01/09	58	15.4	40.9	26.7
SLIDE ROCK MOUNTAIN	7100	2/24/09	34	10.1	11.7	12.6	TOATS COULEE	2850	2/23/09	11	1.8	3.8	3.4
SOURDOUGH GUL SNOTEL	4000	3/01/09	8	3.5	12.8	--	TOGO	3370	2/28/09	24	6.4	12.6	8.6
SOUTH BALDY	4920	3/02/09	40	12.6	24.9	--	TOUCHET SNOTEL	5530	3/01/09	67	24.7	36.4	28.5
SPENCER MDW SNOTEL	3400	3/01/09	60	22.2	51.4	28.6	TRINKUS LAKE	6100	2/28/09	101	32.3	34.6	36.4
SPIRIT LAKE SNOTEL	3520	3/01/09	5	6.0	16.4	6.2	TROUGH #2 SNOTEL	5480	3/01/09	20	5.3	5.0	9.3
SPOTTED BEAR MTN.	7000	2/25/09	42	12.0	13.8	12.7	TRUMAN CREEK	4060	2/26/09	23	5.7	6.4	4.4
SPRUCE SPGS SNOTEL	5700	3/01/09	43	14.0	23.3	--	TUNNEL AVENUE	2450	3/03/09	36	14.3	29.7	18.6
STARVATION MOUNTAIN	6750	2/26/09	42	10.5	15.6	16.6	TWELVEMILE SNOTEL	5600	3/01/09	51	16.3	21.1	16.0
STAHL PEAK SNOTEL	6030	3/01/09	74	22.5	33.8	29.9	TWIN CAMP	4100	2/25/09	53	21.6	25.7	21.5
STAMPEDE PASS SNOTEL	3850	3/01/09	74	25.5	53.2	39.8	TWIN CREEKS	3580	2/23/09	27	4.8	12.3	10.2
STEMPLE PASS	6600	2/23/09	30	9.1	8.5	8.3	TWIN LAKES SNOTEL	6400	3/01/09	91	32.7	41.7	34.7
STEVENS PASS SNOTEL	3950	3/01/09	73	22.1	38.9	38.3	TWIN SPIRIT DIVIDE	3480	3/01/09	34	10.8	--	13.1
STORM LAKE	7780	2/24/09	73	11.6	10.3	10.2	UPPER HOLLAND LAKE	6200	2/28/09	84	27.2	27.9	30.0
STRYKER BASIN	6180	2/25/09	66	21.4	31.3	26.9	UPPER WHEELER SNOTEL	4330	3/01/09	27	7.6	12.7	11.7
SUNSET SNOTEL	5540	3/01/09	---	16.3	22.9	26.0	WARM SPRINGS SNOTEL	7800	3/01/09	71	20.7	16.9	17.0
SURPRISE LKS SNOTEL	4290	3/01/09	95	30.6	52.5	40.1	WATSON LAKES AM	4500	2/27/09	93	34.0	72.9	48.6
SWAMP CREEK SNOTEL	3930	3/01/09	44	15.1	20.0	17.2	WATERHOLE SNOTEL	5010	3/01/09	52	18.5	45.1	30.0
TEN MILE LOWER	6600	2/20/09	21	5.1	5.6	5.9	WEASEL DIVIDE	5450	3/02/09	62	21.9	28.4	28.7
TEN MILE MIDDLE	6800	2/20/09	27	7.1	7.5	8.9	WELLS CREEK SNOTEL	4030	3/01/09	55	17.6	33.9	28.4
							WHITE PASS ES SNOTEL	4440	3/01/09	55	17.0	25.7	21.8





Natural Resources Conservation Service

Washington State  
Snow, Water and Climate Services

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### Helpful Internet Addresses

#### NRCS Snow Survey and Climate Services Homepages

Washington:  
<http://www.wa.nrcs.usda.gov/snow>

Oregon:  
<http://www.or.nrcs.usda.gov/snow>

Idaho:  
<http://www.id.nrcs.usda.gov/snow>

National Water and Climate Center (NWCC):  
<http://www.wcc.nrcs.usda.gov>

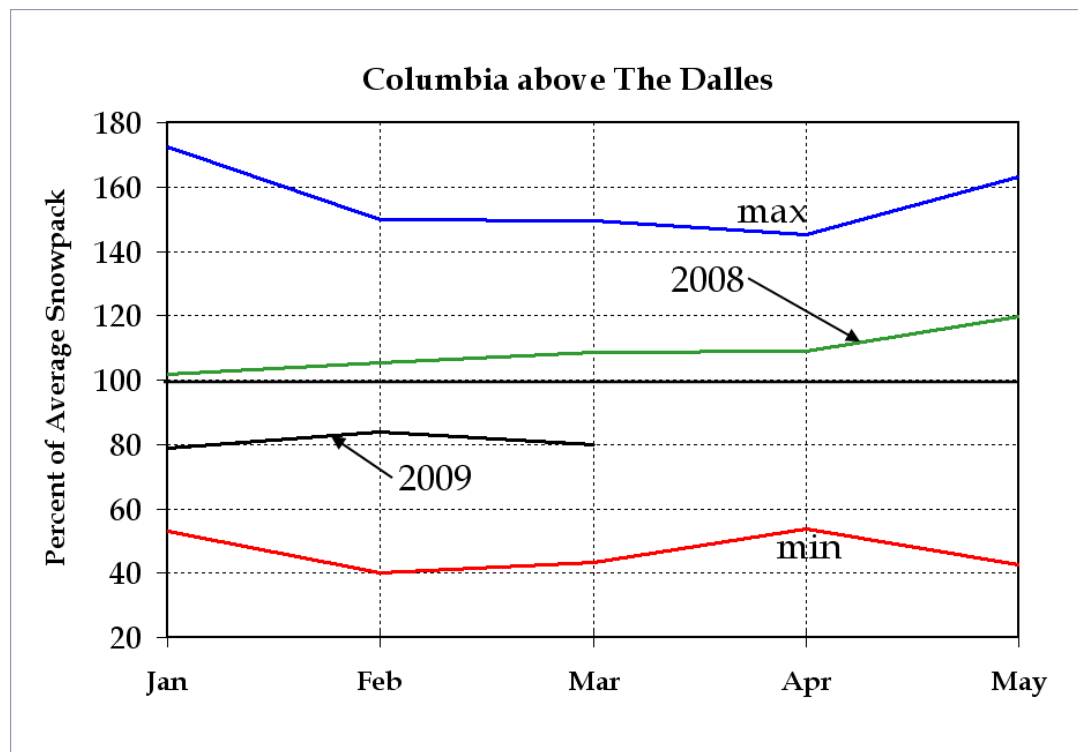
NWCC Anonymous FTP Server:  
<ftp.wcc.nrcs.usda.gov>

#### USDA-NRCS Agency Homepages

Washington:  
<http://www.wa.nrcs.usda.gov>

NRCS National:  
<http://www.nrcs.usda.gov>





March 1, 2009

The Columbia Basin snowpack charts are produced, using only automated data. These data are telemetered via remote collection sites in Canada and the United States. The data are provisional, until they are officially released by the responsible data collection agency.

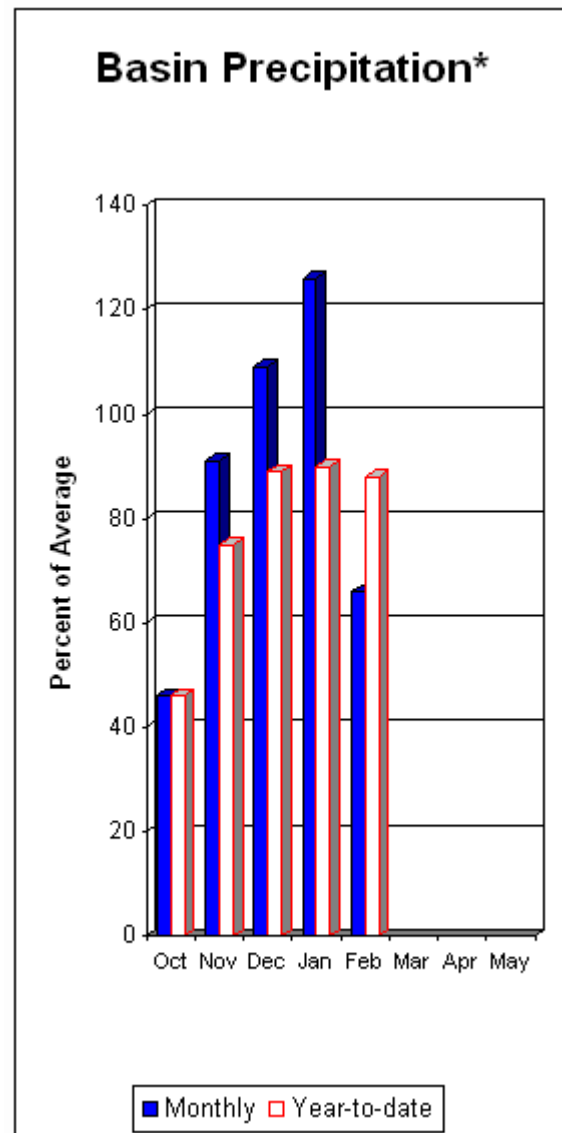
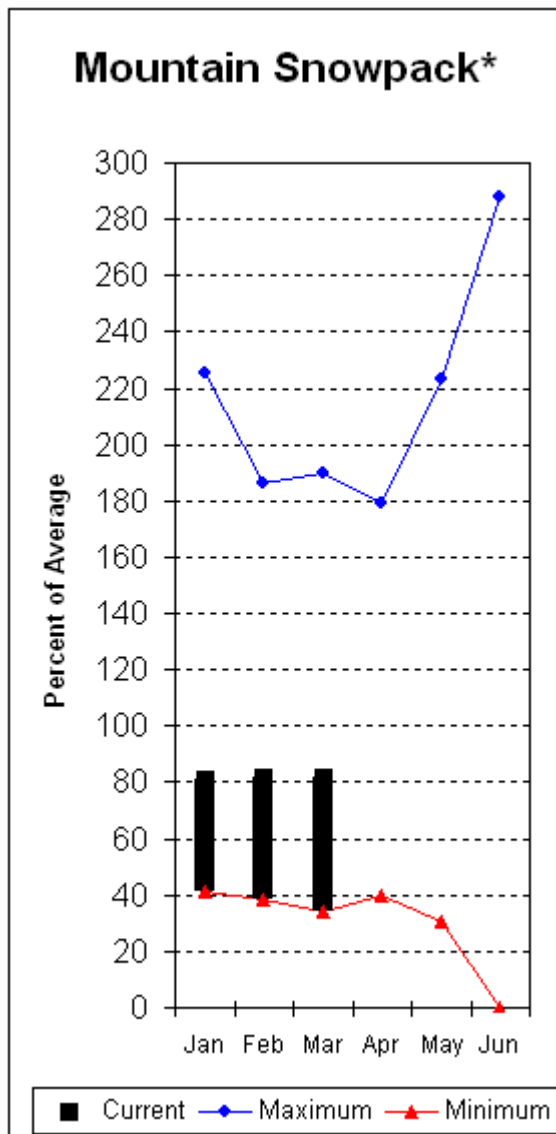
Overall, snow conditions in the Columbia Basin just keep getting worse, with below normal precipitation expected over the next three months. The combined snowpack above The Dalles is currently at 80 percent of average, compared to 109 percent last year and 84 percent last month. Nearly all snow packs decreased from last month, compared to percent of average. The largest losses to average were the Northern Cascades in Washington, that dropped 10 percent. The Upper and Southern Snake, Salmon, and Clearwater snow packs all decreased 8 percent during February. Precipitation was below normal over the entire Columbia Basin, with the Northern Cascades, Clearwater, and Salmon basins especially dry. With below normal precipitation expected for the next three months, prospects for any improvement in the Columbia Basin snow pack look dismal.

The overall snow pack is at 68 percent of the average peak snow water equivalent (swe) accumulation. This compares to 93 percent last year. As a reference, the March 1 snow pack is normally at 85 percent of the peak swe, which usually occurs around April 1.

The snowpack in the Columbia Basin above Castlegar is at 80 percent of average. This compares to 108 percent last year and 82 percent last month. For the basin above Grand Coulee, the snowpack is little better at 81 percent of average, compared to 107 percent last year and 83 percent last month. The Snake River snowpack above Ice Harbor is at 82 percent of average, compared to 110 percent last year and 89 percent last month. The North Cascades snow pack is the lowest at 61 percent of average (down from 71 percent last month), while the snowpack in the Deschutes is the highest at 90 percent (managing to hold its own through the month of February).

At this point in time, the combination of below normal snow packs and below normal precipitation expectations for the remainder of the Winter season, the 2009 water supply potential within the Columbia Basin does not look very good.

## Spokane River Basin



\*Based on selected stations

The March 1 forecasts for summer runoff within the Spokane River Basin are 83% of average near Post Falls and 84% at Long Lake. The Chamokane River near Long Lake forecasted to have 75% of average flows for the May-August period. The forecast is based on a basin snowpack that is 82% of average and precipitation that is 88% of average for the water year. Precipitation for January was below normal at 66% of average. Streamflow on the Spokane River at Long Lake was 53% of average for January. March 1 storage in Coeur d'Alene Lake was 90,000 acre feet, 62% of average and 38% of capacity. Snowpack at Quartz Peak SNOTEL site was 84% of average with 16.4 inches of water content. Average temperatures in the Spokane basin were near normal for February and near normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Spokane River Basin

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)
		=====		Chance Of Exceeding *		=====		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
SPOKANE near Post Falls (2)	APR-JUL	1460	1810	2050	80	2290	2640	2550
	APR-SEP	1540	1890	2130	80	2370	2720	2650
SPOKANE at Long Lake (2)	APR-JUL	1740	2130	2390	84	2650	3040	2850
	APR-SEP	1900	2310	2590	84	2870	3280	3070
CHAMOKANE CREEK near Long Lake	MAY-AUG	2.0	5.3	7.6	75	9.9	13.2	10.2

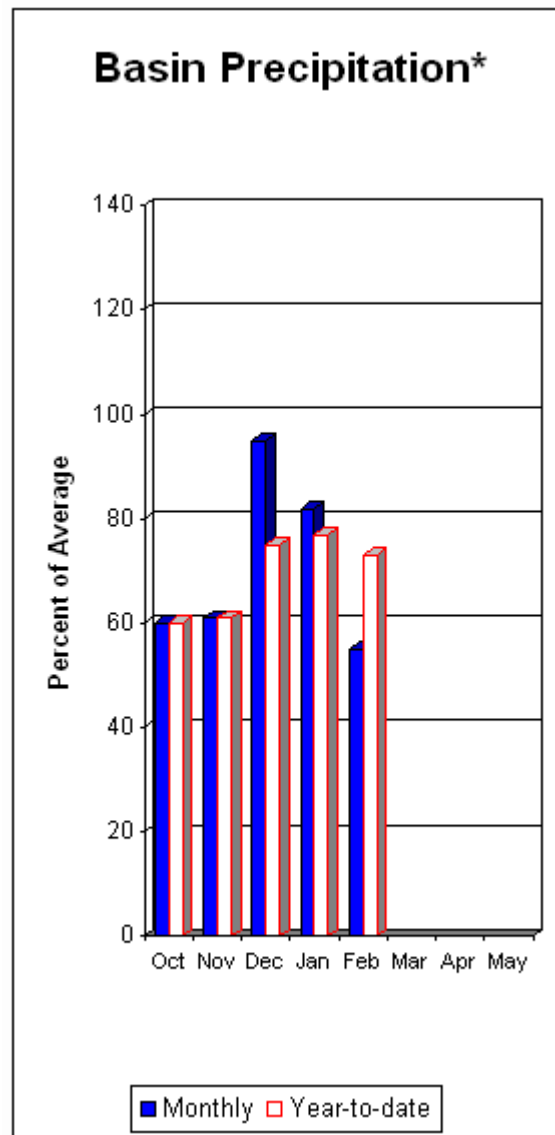
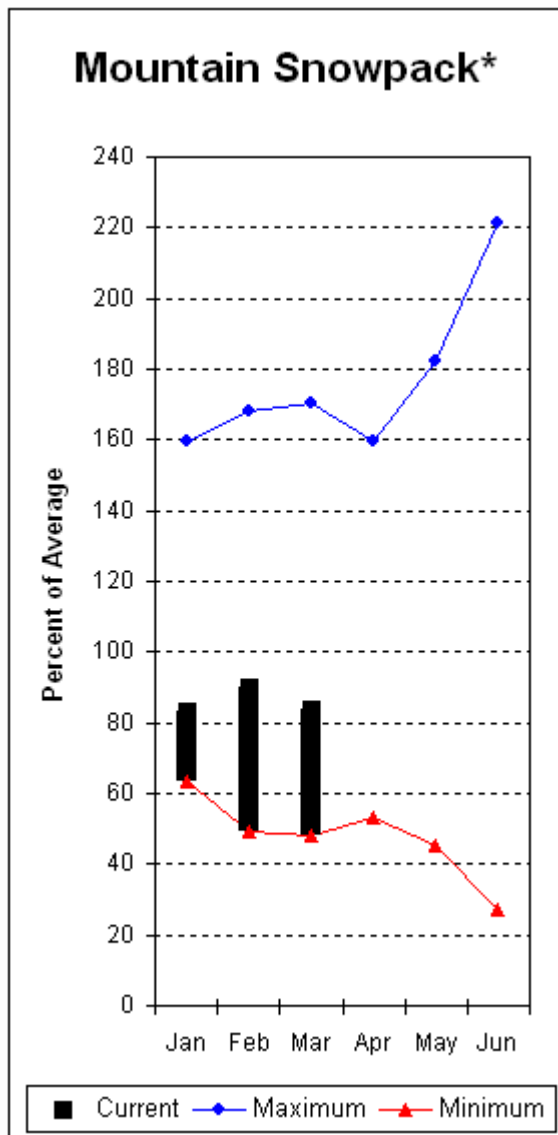
SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of February					SPOKANE RIVER BASIN Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
COEUR D'ALENE	238.5	90.3	54.9	144.9	SPOKANE RIVER	16	63	83
					NEWMAN LAKE	1	63	84

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Pend Oreille River Basins



\*Based on selected stations

The April – September average forecast for the Priest River near the town of Priest River is 85% and the Pen Orielle below Box Canyon is 88%. January streamflow was 63% of average on the Pend Oreille River and 34% on the Columbia at the International Boundary. March 1 snow cover was 84% of average in the Pend Oreille Basin River Basin. Bunchgrass Meadows SNOTEL site had 17.6 inches of snow water on the snow pillow. Normally Bunchgrass would have 24.4 inches on March 1. Precipitation during January was 55% of average, bringing the year-to-date precipitation to 73% of average. Reservoir storage in the basin, including Lake Pend Oreille and Priest Lake was 61% of normal. Average temperatures were near normal for February and near normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Pend Oreille River Basins

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier =====		Future Conditions		===== Wetter =====>>		30-Yr Avg. (1000AF)
		=====		Chance Of Exceeding *		=====		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
PEND OREILLE Lake Inflow (2)	APR-JUL	10400	10700	10900	86	11100	11400	12700
	APR-SEP	11300	11700	11900	86	12100	12500	13900
PRIEST near Priest River (1,2)	APR-JUL	440	600	670	82	740	900	815
	APR-SEP	475	640	715	82	790	955	870
PEND OREILLE bl Box Canyon (2)	APR-JUL	9000	10300	11100	86	11900	13200	12900
	APR-SEP	9500	11000	12100	86	13200	14700	14100

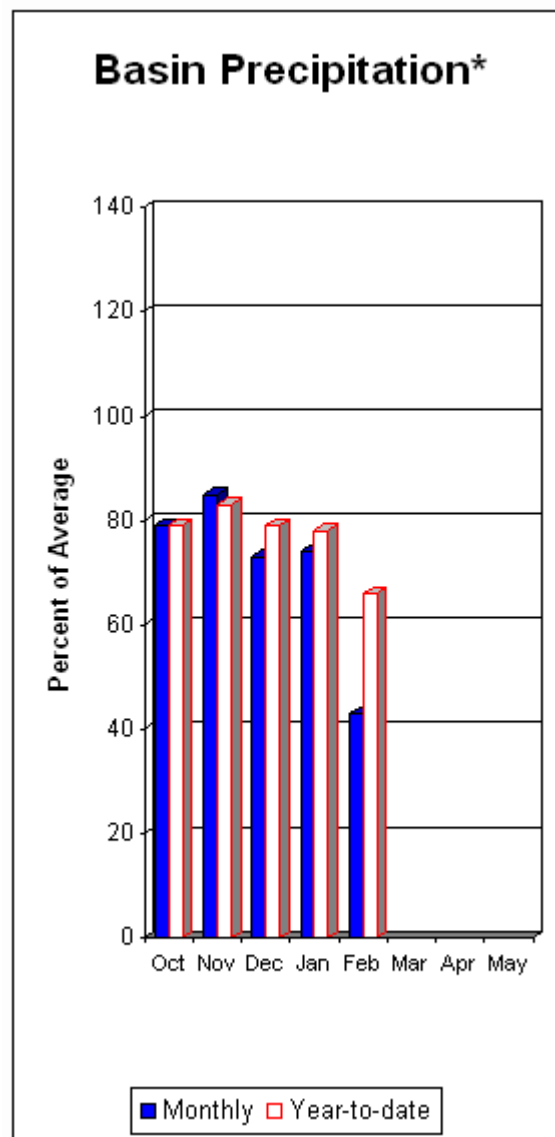
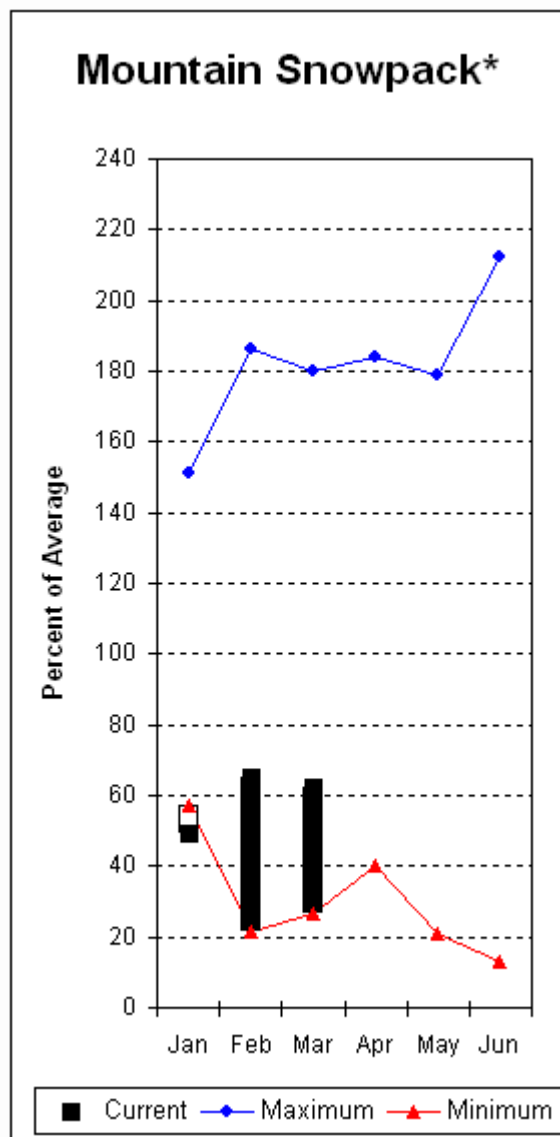
PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of February					PEND OREILLE RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
PEND OREILLE	1561.3	457.8	912.0	778.8	COLVILLE RIVER	0	0	0
PRIEST LAKE	119.3	50.4	48.5	56.8	PEND OREILLE RIVER	9	66	78
					KETTLE RIVER	0	97	0

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Upper Columbia River Basins



\*Based on selected stations

Summer runoff average forecast for the Okanogan River is 60%, Similkameen River is 62%, Kettle River 84% and Methow River is 63%. March 1 snow cover on the Okanogan was 56% of average, Omak Creek was 56% and the Methow was 60%. January precipitation in the Upper Columbia was 43% of average, with precipitation for the water year at 66% of average. January streamflow for the Methow River was 98% of average, 49% for the Okanogan River and 63% for the Similkameen. Snow-water content at Salmon Meadows SNOTEL was 4.1 inches. Average for this site is 10.1 inches on March 1. Combined storage in the Conconully Reservoirs was 15,000-acre feet, which is 64% of capacity and 88% of the March 1 average. Temperatures were near normal for January and 1 degree below normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Upper Columbia River Basins

## Streamflow Forecasts - March 1, 2009

		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
COLVILLE at Kettle Falls	APR-JUL	56	91	115	90	139	174	128
	APR-SEP	59	99	127	90	155	195	141
KETTLE near Laurier	APR-JUL	1100	1400	1600	86	1800	2100	1870
	APR-SEP	1160	1470	1680	85	1890	2200	1970
COLUMBIA at Birchbank (1,2)	APR-JUL	28000	30200	31200	89	32200	34400	34900
	APR-SEP	35700	37900	38900	89	39900	42100	43500
COLUMBIA at Grand Coulee Dm (1,2)	APR-JUL	43400	46200	47500	88	48800	51600	53800
	APR-SEP	51200	54700	56300	88	57900	61400	64000
Similkameen R nr Nighthawk (1)	APR-JUL	490	730	835	62	940	1180	1350
	APR-SEP	550	790	900	62	1010	1250	1450
Okanogan R nr Tonasket (1)	APR-JUL	475	800	950	60	1100	1430	1580
	APR-SEP	535	895	1060	60	1220	1590	1770
Okanogan R at Malott (1)	APR-JUL	485	825	980	60	1130	1470	1635
	APR-SEP	555	930	1100	60	1270	1650	1826
Methow R nr Pateros	APR-SEP	460	555	620	63	685	780	985
	APR-JUL	420	515	575	63	635	730	910

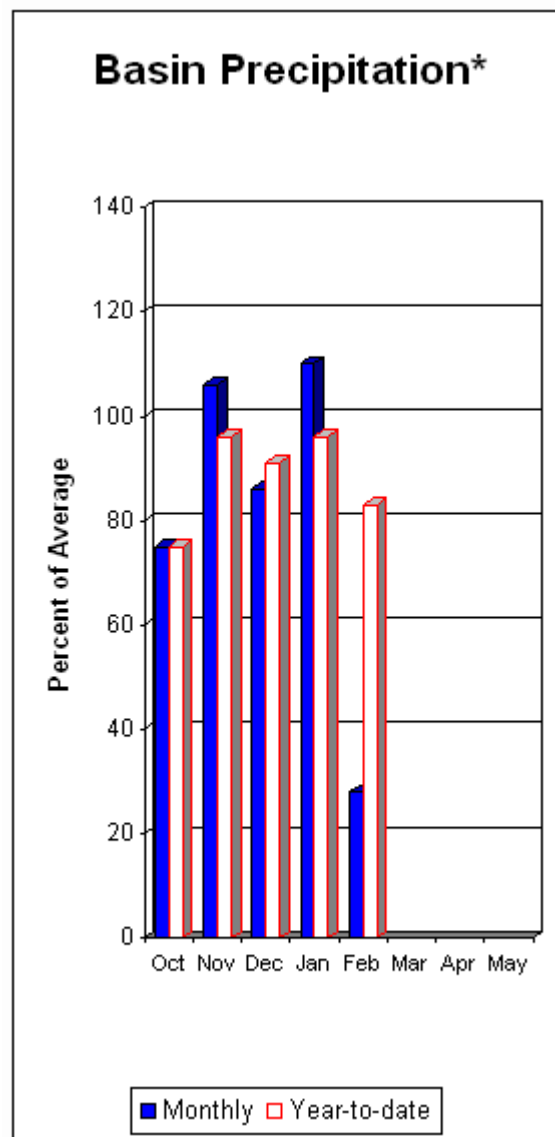
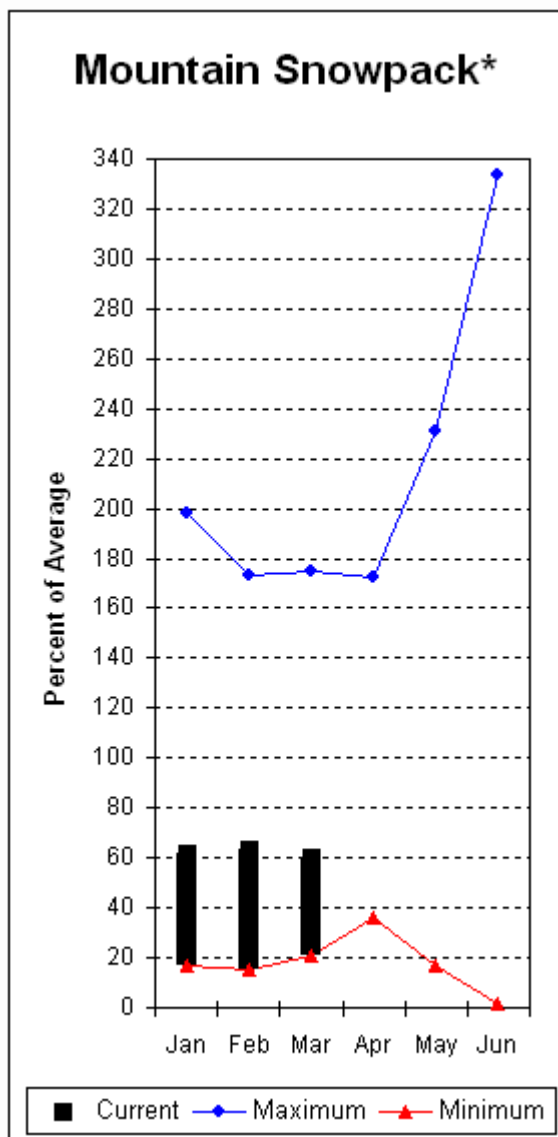
UPPER COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of February					UPPER COLUMBIA RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
SALMON LAKE	10.5	6.7	7.8	8.4	OKANOGAN RIVER	5	57	56
CONCONULLY RESERVOIR	13.0	8.3	7.7	8.7	OMAK CREEK	3	63	56
					SANPOIL RIVER	1	68	103
					SIMILKAMEEN RIVER	0	0	0
					TOATS COULEE CREEK	1	49	53
					CONCONULLY LAKE	3	43	41
					METHOW RIVER	8	59	60

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Central Columbia River Basins



\*Based on selected stations

Precipitation during January was 28% of average in the basin and 83% for the year-to-date. Runoff for Entiat River is forecast to be 70% of average for the summer. The March-September average forecast for Chelan River is 69%, Wenatchee River at Plain is 72%, Stehekin River is 77% and Icicle Creek is 76%. January average streamflows on the Chelan River were 64% and on the Wenatchee River 62%. March 1 snowpack in the Wenatchee River Basin was 63% of average; the Chelan, 62%; the Entiat, 56%; Stemilt Creek, 61% and Colockum Creek, 57%. Reservoir storage in Lake Chelan was 273,000-acre feet, 109% of March 1 average and 40% of capacity. Miners Ridge SNOTEL had the most snow water with 34.6 inches of water. This site would normally have 45.2 inches on March 1. Temperatures were near normal for January and 1 degree below normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*



# Central Columbia River Basins

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier =====		Future Conditions		===== Wetter =====>		30-Yr Avg. (1000AF)
		=====		Chance Of Exceeding *		=====		
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Stehekin R at Stehekin	APR-JUL	420	490	540	77	590	660	700
	APR-SEP	510	585	635	77	685	760	830
Chelan R at Chelan (2)	APR-JUL	585	670	725	69	780	865	1050
	APR-SEP	670	760	825	69	890	980	1190
Entiat R nr Ardenvoir	APR-JUL	117	137	150	70	163	183	215
	APR-SEP	135	154	168	70	182	200	240
Wenatchee R at Plain	APR-JUL	620	715	775	72	835	930	1070
	APR-SEP	690	785	850	72	915	1010	1180
Icicle Ck nr Leavenworth	APR-JUL	193	220	235	76	250	275	310
	APR-SEP	215	240	260	77	280	305	340
Wenatchee R at Peshastin	APR-JUL	895	1020	1100	74	1180	1310	1480
	APR-SEP	980	1110	1200	74	1290	1420	1630

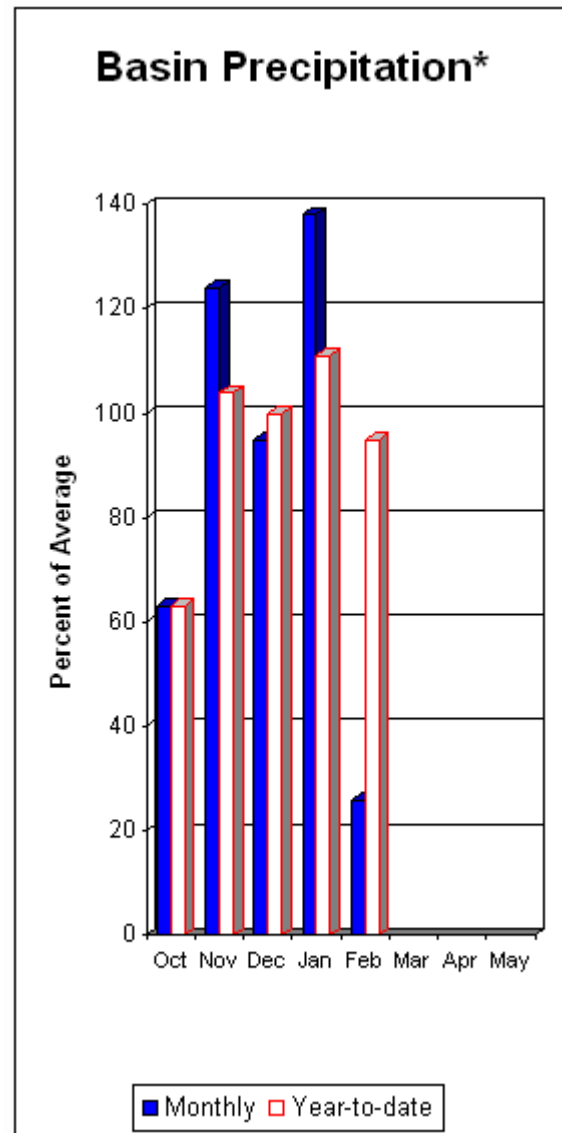
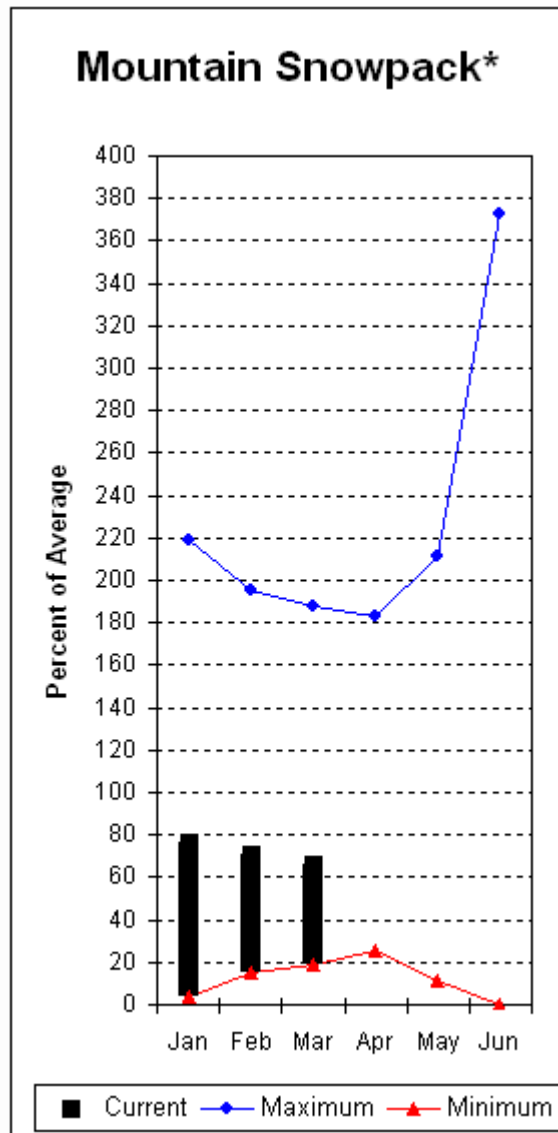
CENTRAL COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of February					CENTRAL COLUMBIA RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
CHELAN LAKE	676.1	273.0	150.3	250.1	CHELAN LAKE BASIN	5	64	62
					ENTIAT RIVER	1	57	56
					WENATCHEE RIVER	8	60	63
					STEMILT CREEK	2	56	61
					COLOCKUM CREEK	1	106	57

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Upper Yakima River Basin



\*Based on selected stations

March 1 reservoir storage for the Upper Yakima reservoirs was 655,000-acre feet, 131% of average. Forecasts for the Yakima River at Cle Elum are 74% of average and the Teanaway River near Cle Elum is at 70%. Lake inflows are all forecasted to be slightly below normal this summer. January streamflows within the basin were Yakima at Cle Elum at 41% and Cle Elum River near Roslyn at 41%. March 1 snowpack was 66% based upon 9 snow course and SNOTEL readings within the Upper Yakima Basin. Precipitation was 26% of average for January and 95% year-to-date for water. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

*For more information contact your local Natural Resources Conservation Service office.*

# Upper Yakima River Basin

## Streamflow Forecasts - March 1, 2009

		<<===== Drier =====		Future Conditions		===== Wetter =====>>		
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
Keechelus Reservoir Inflow (2)	APR-JUL	62	79	91	75	103	120	121
	APR-SEP	70	88	100	75	112	130	133
Kachess Reservoir Inflow (2)	APR-JUL	59	73	83	75	93	107	111
	APR-SEP	66	80	90	75	100	114	120
Cle Elum Lake Inflow (2)	APR-JUL	250	285	310	76	335	370	410
	APR-SEP	275	315	340	76	365	405	450
Yakima R at Cle Elum (2)	APR-JUL	420	530	605	74	680	790	820
	APR-SEP	465	585	670	74	755	875	900
Teanaway R bl Forks nr Cle Elum	APR-JUL	69	87	100	70	113	131	143
	APR-SEP	71	89	102	70	115	133	146

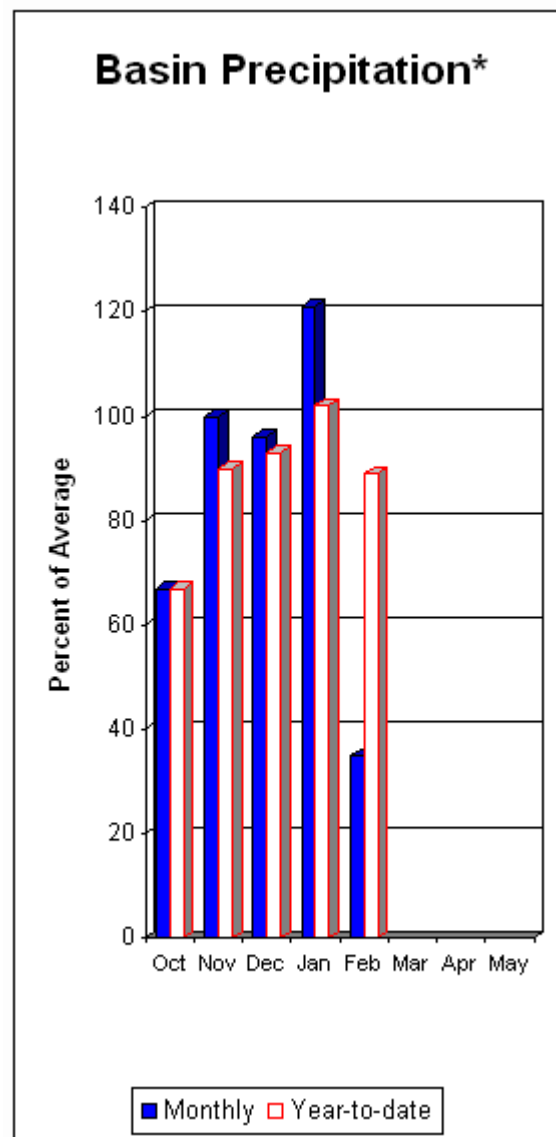
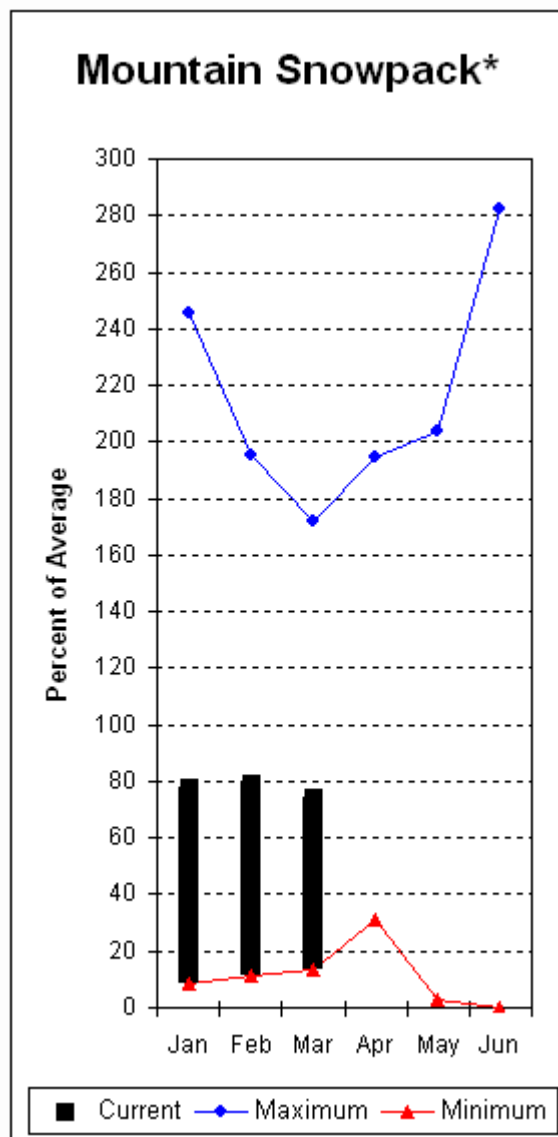
UPPER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of February					UPPER YAKIMA RIVER BASIN Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
KEECHELUS	157.8	126.9	64.2	102.4	UPPER YAKIMA RIVER	9	51	66
KACHESS	239.0	209.6	146.3	154.7				
CLE ELUM	436.9	318.8	134.1	241.4				

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Lower Yakima River Basin



\*Based on selected stations

January average streamflows within the basin were: Yakima River near Parker, 44%; Naches River near Naches, 55%; and Yakima River at Kiona, 58%. March 1 reservoir storage for Bumping and Rimrock reservoirs was 152,000-acre feet, 110% of average. Forecast averages for Yakima River near Parker are 76%; American River near Nile, 81%; Ahtanum Creek, 84%; and Klickitat River near Glenwood, 90%. March 1 snowpack was 74% based upon 7 snow course and SNOTEL readings within the Lower Yakima Basin and Ahtanum Creek reported in at 77% of average. Precipitation was 35% of average for January and 89% year-to-date for water. Temperatures were 1 degree below normal for January and 1 degree below for the water year. Volume forecasts for Yakima Basin are for natural flow. As such, they March differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

*For more information contact your local Natural Resources Conservation Service office.*

# Lower Yakima River Basin

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Bumping Lake Inflow (2)	APR-JUL	78	92	101	83	110	124	122
	APR-SEP	86	100	110	83	120	134	132
American R nr Nile	APR-JUL	67	79	87	81	95	107	108
	APR-SEP	74	86	95	81	104	116	118
Rimrock Lake Inflow (2)	APR-JUL	136	153	164	80	175	192	205
	APR-SEP	160	179	192	80	205	225	240
Naches R nr Naches (2)	APR-JUL	455	535	590	82	645	725	720
	APR-SEP	495	580	640	82	700	785	780
Ahtanum Ck at Union Gap	APR-JUL	15.4	21	25	83	29	35	30
	APR-SEP	17.3	23	27	84	31	37	32
Yakima R nr Parker (2)	APR-JUL	1020	1230	1370	76	1510	1720	1800
	APR-SEP	1140	1350	1500	76	1650	1860	1980
Klickitat near Glenwood	APR-JUL	94	105	113	90	121	132	126
	APR-SEP	126	138	147	90	156	168	163
Klickitat River near Pitt WA	APR-JUL	345	390	415	90	440	485	462
	APR-SEP	420	470	500	89	530	580	559

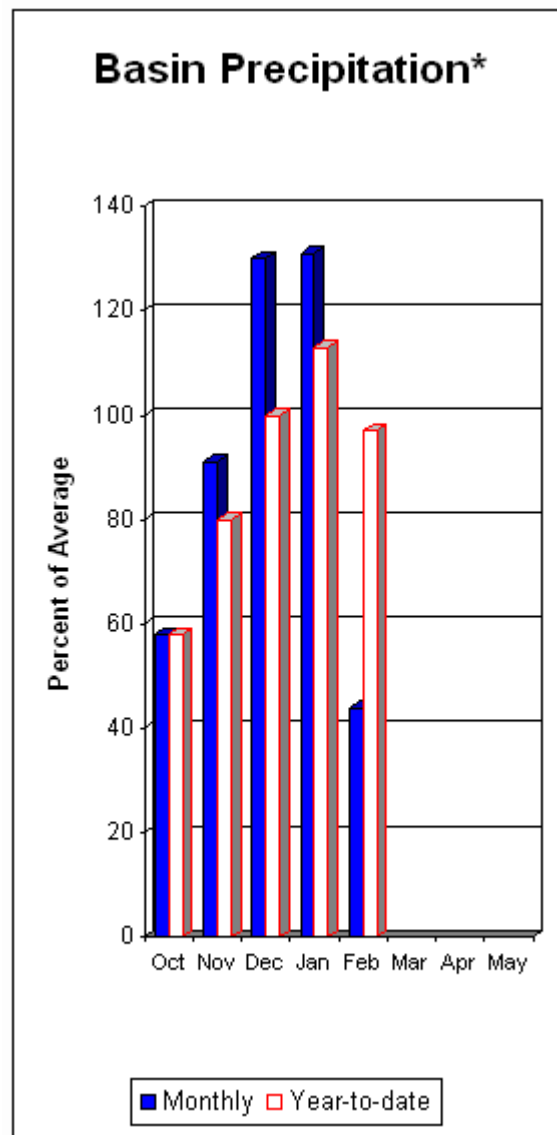
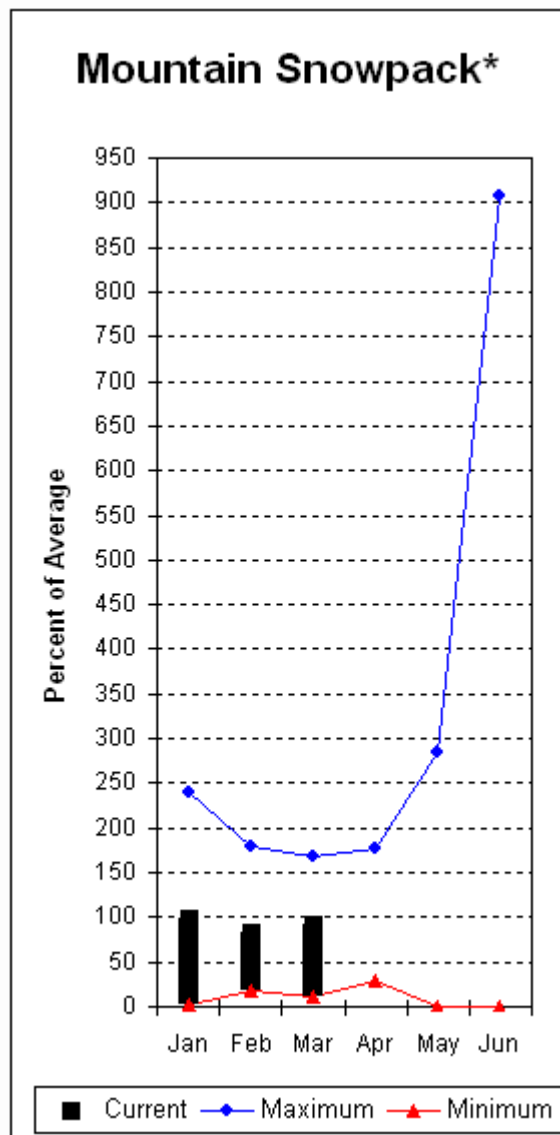
LOWER YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of February					LOWER YAKIMA RIVER BASIN Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
BUMPING LAKE	33.7	12.7	7.4	11.5	LOWER YAKIMA RIVER	7	63	74
RIMROCK	198.0	139.3	112.9	126.1	AHTANUM CREEK	3	71	77

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Walla Walla River Basin



\*Based on selected stations

January precipitation was 44% of average, maintaining the year-to-date precipitation at 97% of average. Snowpack in the basin was 92% of average. Streamflow forecasts are 94% of average for Mill Creek and 93% for the SF Walla Walla near Milton-Freewater. January streamflow was 64% of average for the Walla Walla River. Average temperatures were 2 degree below normal for January and 1 degree below average for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Walla Walla River Basin

## Streamflow Forecasts - March 1, 2009

		<===== Drier =====		Future Conditions		===== Wetter =====>		
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
SF Walla Walla R nr Milton-Freewater	MAR-SEP	63	71	76	94	81	89	81
	APR-JUL	41	47	51	94	55	61	54
	APR-SEP	52	58	63	94	68	74	67
Mill Ck nr Walla Walla	APR-JUL	15.1	19.2	22	92	25	29	24
	APR-SEP	18.7	23	26	93	29	33	28

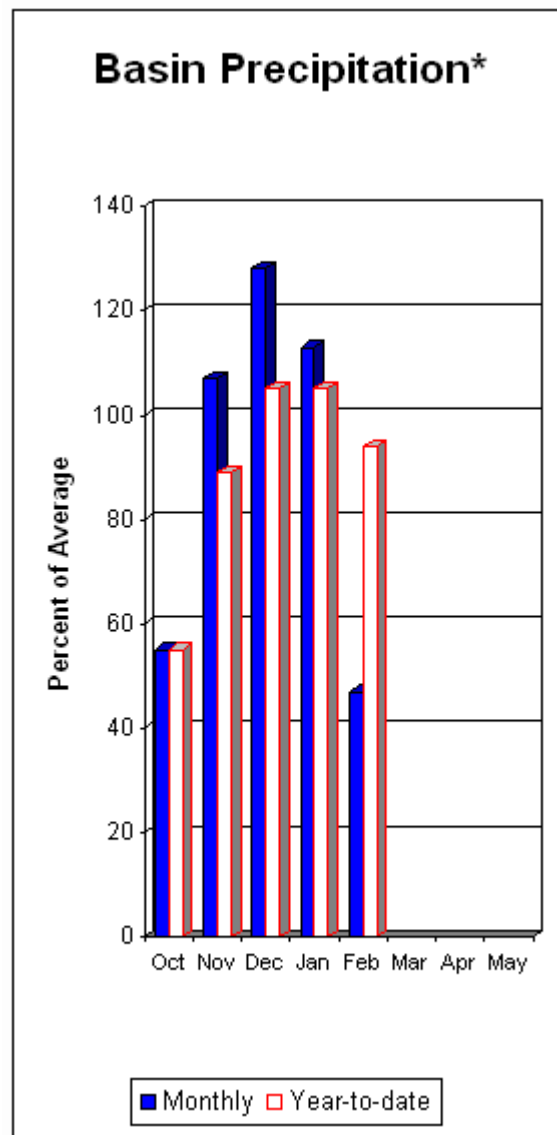
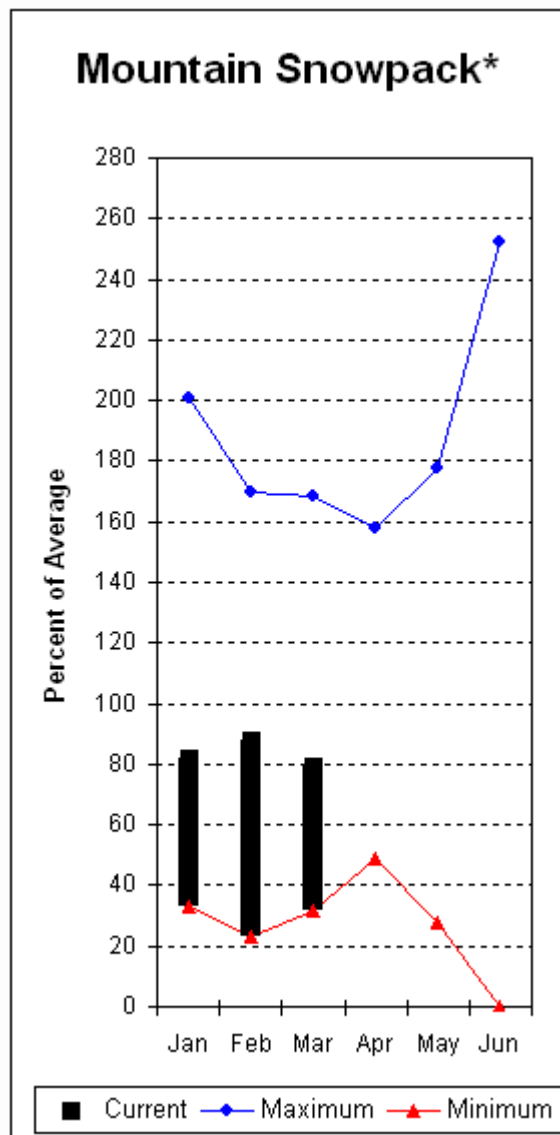
WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of February					WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					WALLA WALLA RIVER	2	68	92

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Lower Snake River Basin



\*Based on selected stations

The April - September forecast is for 87% for Clearwater River at Spalding. The Snake and Grande Ronde rivers can expect summer flows to be about 75% and 87% of normal respectively. January precipitation was 47% of average, bringing the year-to-date precipitation to 94% of average. March 1 snowpack readings averaged 79% of normal. January streamflow was 57% of average for Snake River below Lower Granite Dam and 48% for Grande Ronde River near Troy. Average temperatures were near normal for January and near normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*



# Lower Snake River Basin

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<===== Drier ===== Future Conditions ===== Wetter =====>		Chance Of Exceeding *				30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
Grande Ronde R at Troy	MAR-JUL	840	1143	1280	81	1417	1720	1580
	APR-SEP	701	975	1100	80	1225	1499	1370
Clearwater R at Spalding	APR-JUL	4662	5919	6490	87	7061	8318	7430
	APR-SEP	4931	6257	6860	87	7463	8789	7850
SNAKE blw Lower Granite Dam (1,2)	APR-JUL	8930	13929	16200	75	18471	23470	21600

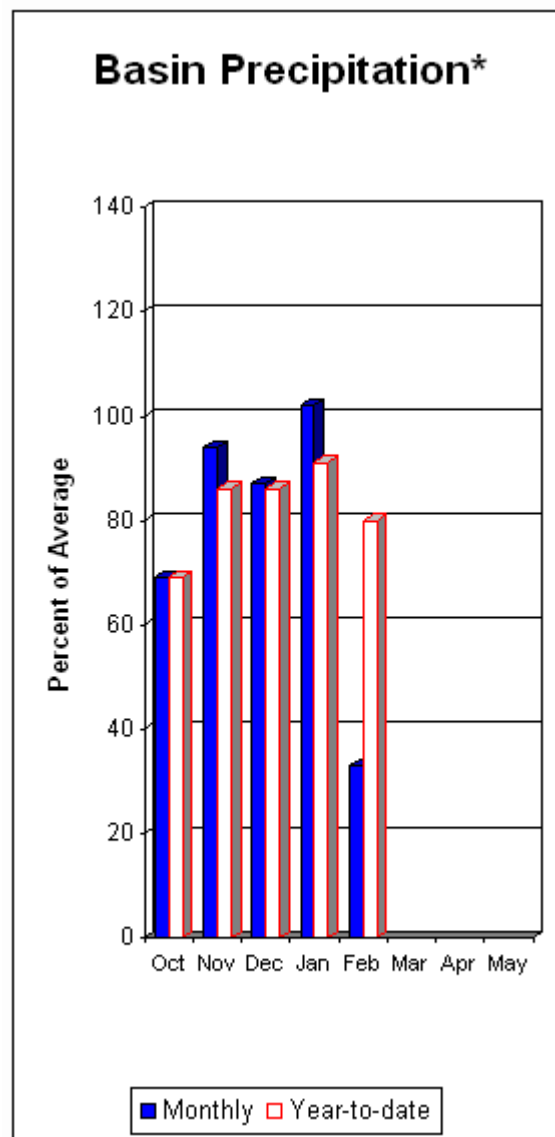
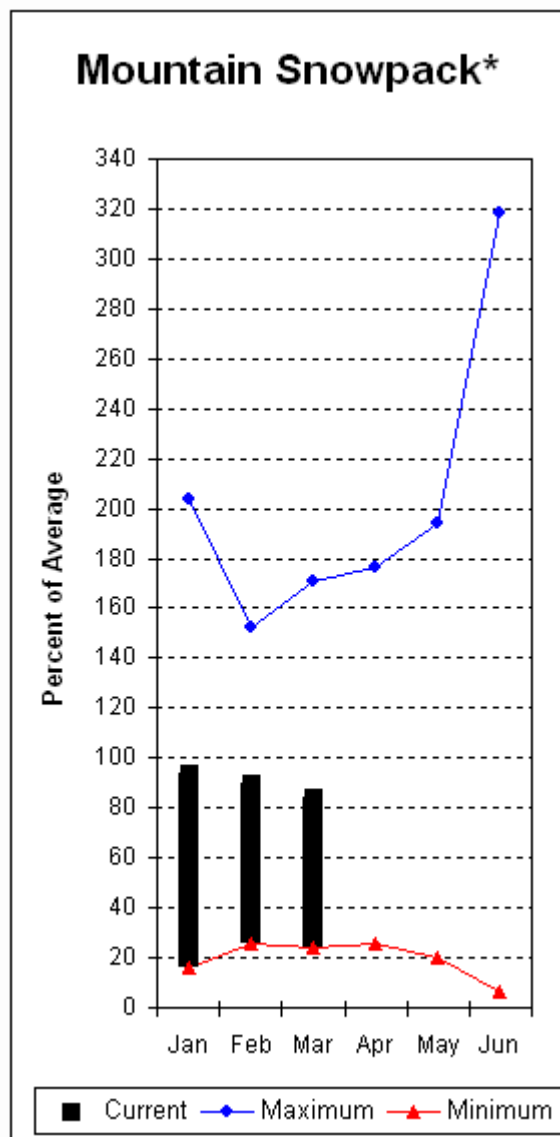
LOWER SNAKE RIVER BASIN Reservoir Storage (1000 AF) - End of February					LOWER SNAKE RIVER BASIN Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
DWORSHAK	3468.0	2296.2	2261.4	2247.3	LOWER SNAKE, GRANDE RONDE	11	65	79

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Lower Columbia River Basins



\*Based on selected stations

Forecasts for April – September streamflows within the basin are Lewis River at Ariel, 92% and Cowlitz River at Castle Rock, 85% of average. The Columbia at The Dalles is forecasted to have 83% of average flows this summer. January average streamflow for Cowlitz River was 55% and 36% for Lewis River. The Columbia River at The Dalles was 61% of average. January precipitation was 33% of average and the water-year average was 80%. March 1 snow cover for Cowlitz River was 88%, and Lewis River was 81% of average. Average temperatures were 2 degrees below normal during January and near normal for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Lower Columbia River Basins

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>				30-Yr Avg. (1000AF)		
		=====		Chance Of Exceeding *			=====	
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)		30% (1000AF)	10% (1000AF)
=====								
Klickitat near Glenwood	APR-JUL	94	105	113	90	121	132	126
	APR-SEP	126	138	147	90	156	168	163
Klickitat River near Pitt WA	APR-JUL	345	390	415	90	440	485	462
	APR-SEP	420	470	500	89	530	580	559
LEWIS at Ariel (2)	APR-JUL	710	855	950	92	1050	1190	1031
	APR-SEP	840	980	1080	92	1180	1320	1176
COWLITZ R. bl Mayfield Dam (2)	APR-JUL	1090	1300	1440	85	1580	1790	1689
	APR-SEP	1210	1460	1630	85	1800	2050	1922
COWLITZ R. at Castle Rock (2)	APR-JUL	1570	1800	1960	85	2120	2350	2295
	APR-SEP	1810	2070	2250	85	2430	2690	2639

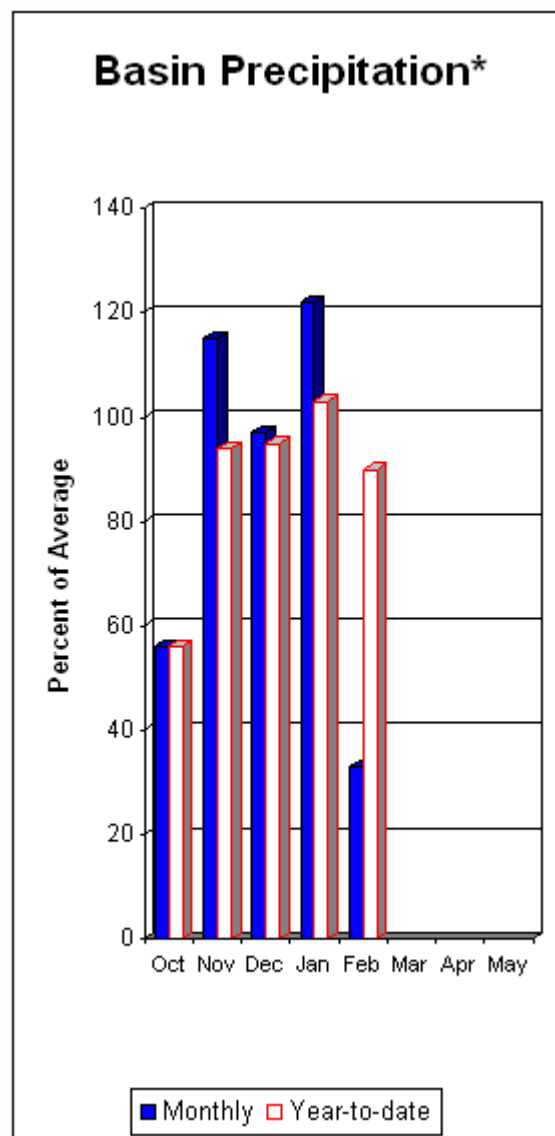
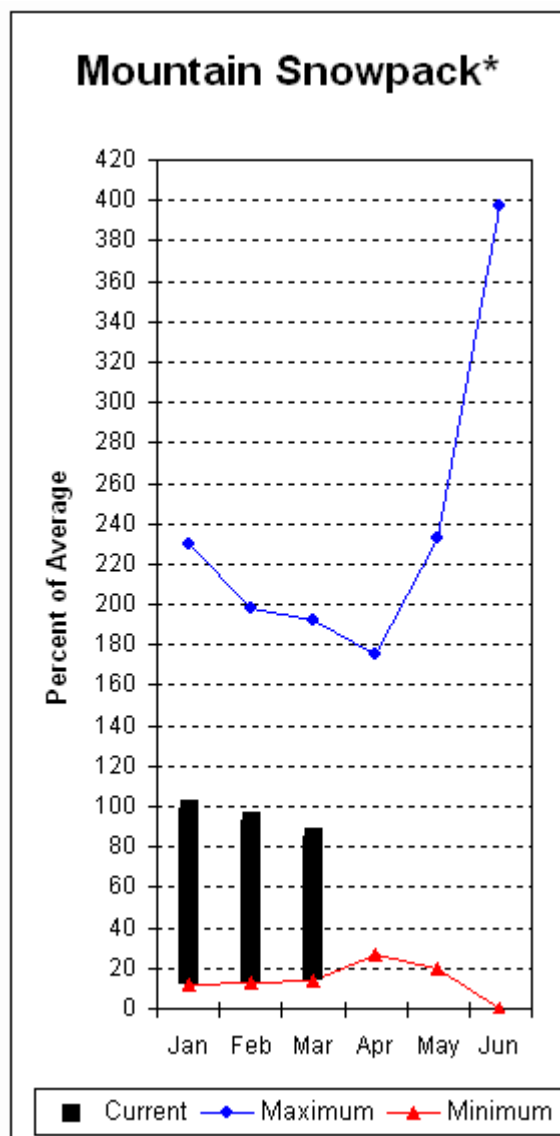
LOWER COLUMBIA RIVER BASINS Reservoir Storage (1000 AF) - End of February					LOWER COLUMBIA RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
MOSSYROCK	0.0	1211.5	962.4	---	LEWIS RIVER	5	51	81
SWIFT		NO REPORT			COWLITZ RIVER	6	60	88
YALE		NO REPORT						
MERWIN		NO REPORT						

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## South Puget Sound River Basins



\*Based on selected stations

Summer runoff is forecast to be 90% of normal for the Green River below Howard Hanson Dam and 98% for the White River near Buckley. March 1 snowpack was 74% of average for the White River, 87% for Puyallup River and 95% in the Green River Basin. Water content on March 1 at Corral Pass SNOTEL, at an elevation of 6,000 feet, was 23.5 inches. This site has a March 1 average of 29.5 inches. January precipitation was 33% of average, bringing the water year-to-date to 90% of average for the basins. Average temperatures in the area 3 degrees below normal for January and near normal for the water-year.

*For more information contact your local Natural Resources Conservation Service office.*

# South Puget Sound River Basins

## Streamflow Forecasts - March 1, 2009

		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	=====		Chance Of Exceeding *		=====		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
WHITE near Buckley (1,2)	APR-JUL	340	400	430	98	460	520	440
	APR-SEP	415	490	525	98	560	635	534
GREEN R below Howard Hansen (1,2)	APR-JUL	125	190	220	91	250	315	243
	APR-SEP	140	210	240	90	270	340	268

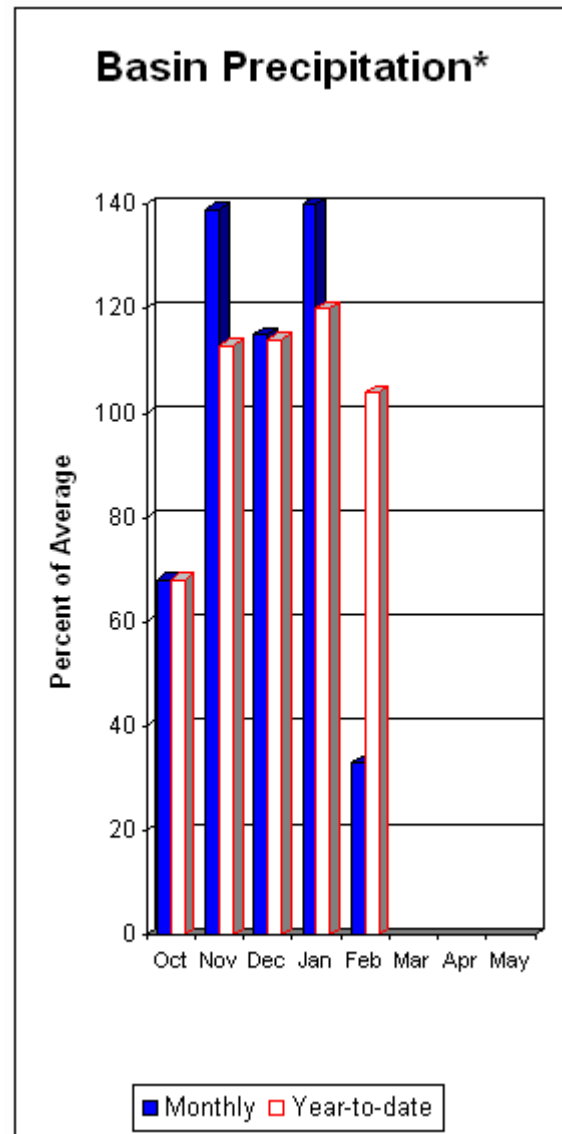
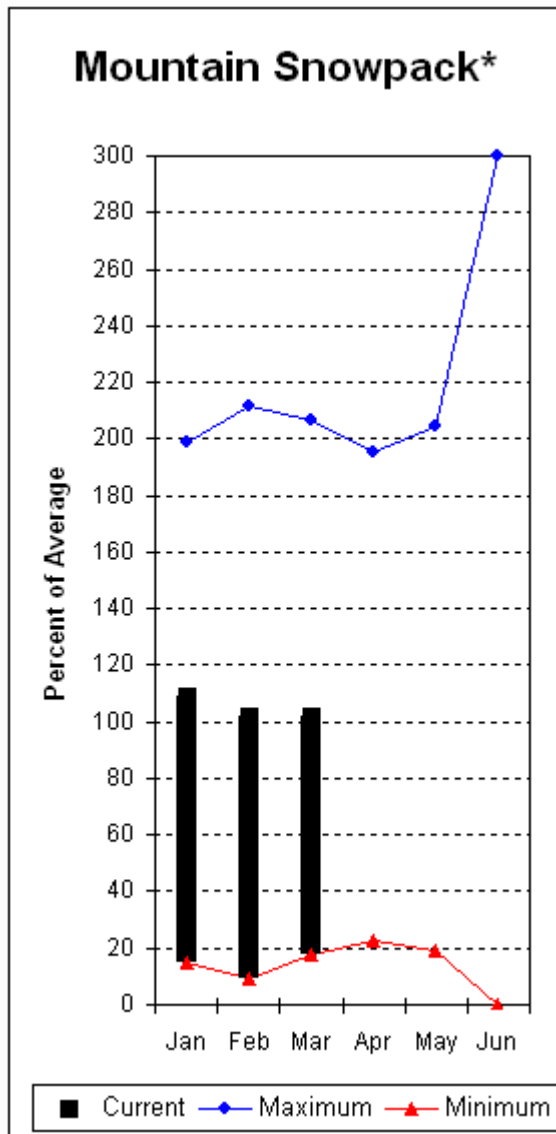
SOUTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of February					SOUTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					WHITE RIVER	3	61	74
					GREEN RIVER	7	63	95
					PUYALLUP RIVER	5	64	87

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Central Puget Sound River Basins



\*Based on selected stations

Forecast for spring and summer flows are: 95% for Cedar River near Cedar Falls; 93% for Rex River; 93% for South Fork of the Tolt River; and 95% for Cedar River at Cedar Falls. Basin-wide precipitation for January was 33% of average, bringing water-year-to-date to 104% of average. March 1 average snow cover in Cedar River Basin was 96%, Tolt River Basin was 125%, Snoqualmie River Basin was 94%, and Skykomish River Basin was 91%. Skookum Creek SNOTEL site, at 3920 feet, had 34.3 inches of water content. Average March 1 water content is 18.9 inches at Skookum Creek. Temperatures were 2 degrees below average for January and near normal for the water-year.

*For more information contact your local Natural Resources Conservation Service office.*

# Central Puget Sound River Basins

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>				30-Yr Avg. (1000AF)		
		=====		Chance Of Exceeding *			=====	
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)		30% (1000AF)	10% (1000AF)
=====								
CEDAR near Cedar Falls	APR-JUL	53	63	70	96	77	87	73
	APR-SEP	59	69	76	95	83	93	80
REX near Cedar Falls	APR-JUL	15.9	20	23	92	26	30	25
	APR-SEP	18.5	23	26	93	29	34	28
CEDAR RIVER at Cedar Falls	APR-JUL	48	61	70	95	79	92	74
	APR-SEP	47	60	69	95	78	91	73
SOUTH FORK TOLT near Index	APR-JUL	10.4	12.4	13.8	94	15.2	17.2	14.7
	APR-SEP	12.3	14.4	15.8	94	17.2	19.3	16.9

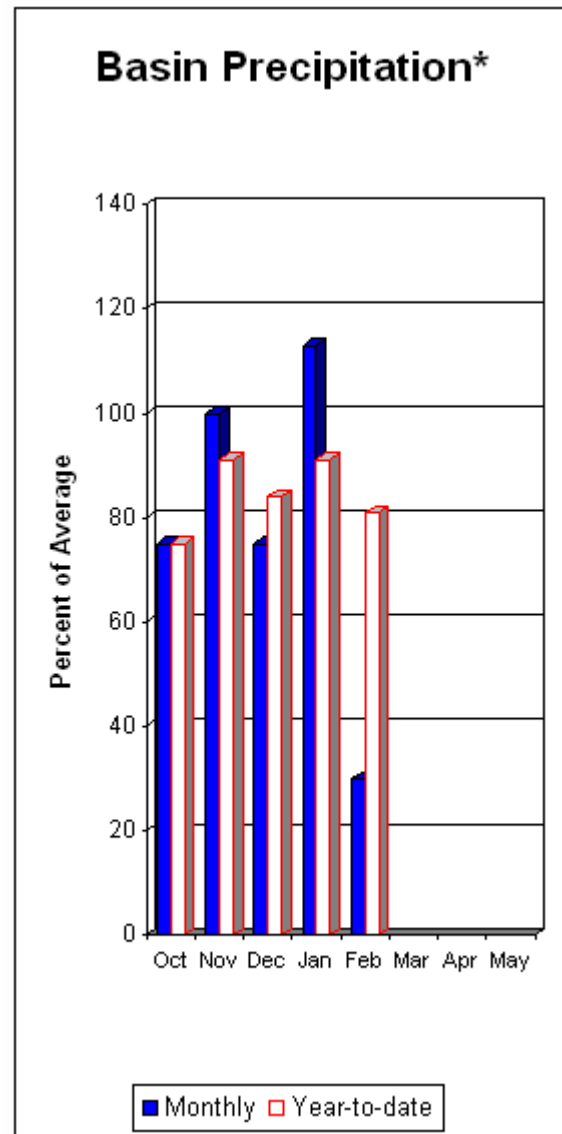
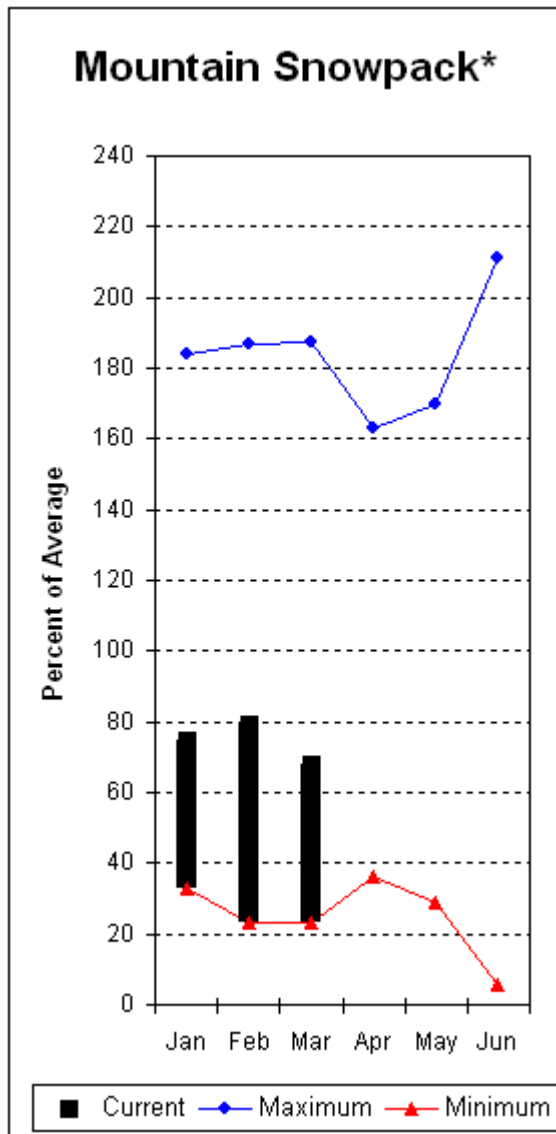
CENTRAL PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of February					CENTRAL PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					CEDAR RIVER	6	43	96
					TOLT RIVER	3	58	125
					SNOQUALMIE RIVER	5	53	94
					SKYKOMISH RIVER	3	57	91

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## North Puget Sound River Basins



\*Based on selected stations

Forecast for Skagit River streamflow at Newhalem is 79% of average for the spring and summer period. January streamflow in Skagit River was 53% of average. Other forecast points included Baker River at 77% and Thunder Creek at 80% of average. Basin-wide precipitation for January was 30% of average, bringing water-year-to-date to 81% of average. March 1 average snow cover in Skagit River Basin was 68%, and Nooksack River Basin was 67%. Baker River Basin snow surveys reported 70% of average as well. Rainy Pass SNOTEL, at 4,780 feet, had 21.6 inches of water content. Average March 1 water content is 38.2 inches at Rainy Pass. March 1 Skagit River reservoir storage was 110% of average and 67% of capacity. Average temperatures for January were 3 degrees below normal for the basin and 2 degrees below average for the water year.

*For more information contact your local Natural Resources Conservation Service office.*



# North Puget Sound River Basins

## Streamflow Forecasts - March 1, 2009

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>						30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
THUNDER CREEK near Newhalem	APR-JUL	151	171	185	79	199	220	234
	APR-SEP	225	250	265	80	280	305	333
SKAGIT at Newhalem (2)	APR-JUL	1250	1390	1490	80	1590	1730	1864
	APR-SEP	1520	1660	1760	79	1860	2000	2217
BAKER RIVER near Concrete	APR-JUL	480	575	640	77	705	800	828
	APR-SEP	595	725	810	77	895	1030	1050

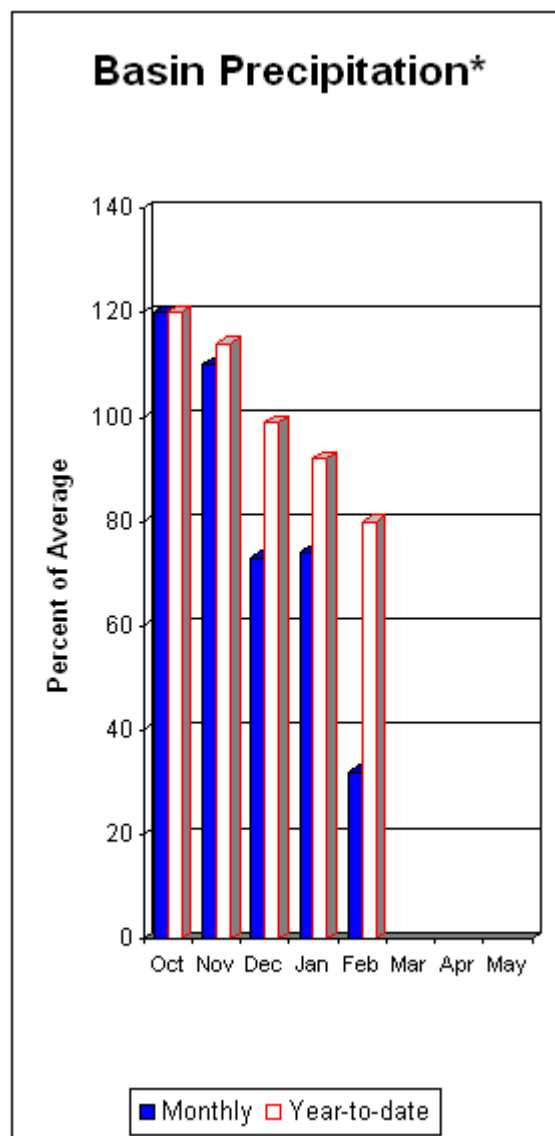
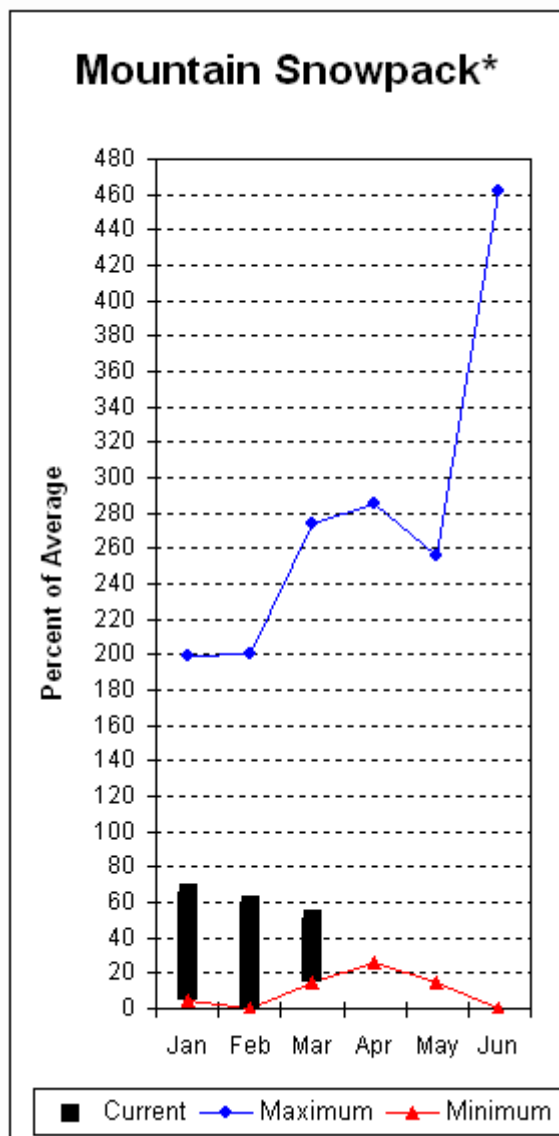
NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of February					NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROSS	1404.1	910.6	697.3	818.3	SKAGIT RIVER	14	61	68
DIABLO RESERVOIR	90.6	86.1	87.3	85.7	BAKER RIVER	9	54	70
					NOOKSACK RIVER	2	49	67

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

## Olympic Peninsula River Basins



\*Based on selected stations

Forecasted average runoff for streamflow for the Dungeness River is 72% and Elwha River is 78%. January runoff in the Dungeness River was 37% of normal. Big Quilcene and Wynoochee rivers should expect below average runoff this summer as well. January precipitation was 32% of average. Precipitation has accumulated at 80% of average for the water year. January precipitation at Quillayute was 3.22 inches. The thirty-year average for January is 12.35 inches. Olympic Peninsula snowpack averaged 51% of normal on March 1. Temperatures were 3 degrees below average for January and near average for the water year.

*For more information contact your local Natural Resources Conservation Service office.*

# Olympic Peninsula River Basins

## Streamflow Forecasts - March 1, 2009

		<<===== Drier ===== Future Conditions ===== Wetter =====>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
DUNGENESS near Sequim	APR-JUL	74	83	89	72	95	104	124
	APR-SEP	89	102	110	72	118	131	152
ELWHA near Port Angeles	APR-JUL	270	305	325	78	345	380	419
	APR-SEP	320	360	390	78	420	460	503

OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of February					OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - March 1, 2009			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					OLYMPIC PENINSULA	6	37	51

\* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural volume - actual volume may be affected by upstream water management.
- (3) - Median value used in place of average. The value listed under 30% is actually a 25% exceedance level.  
The value listed under 70% is actually a 75% exceedance level.

*Issued by*

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**U.S. Department of Agriculture**

*Released by*

**Roylene Rides At The Door**  
**State Conservationist**  
**Natural Resources Conservation Service**  
**Spokane, Washington**

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## The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work\*:

<b>Canada</b>	Ministry of Sustainable Resources Snow Survey, River Forecast Centre, Victoria, British Columbia
<b>State</b>	Washington State Department of Ecology Washington State Department of Natural Resources
<b>Federal</b>	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs Recourse Conservation & Development Councils
<b>Local</b>	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Power and Light Company Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County Kalispel Tribe of Indians Spokane Indian Tribe Jamestown S'klallum Tribe
<b>Private</b>	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

\*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.



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# **Washington Water Supply Outlook Report**

**Natural Resources Conservation Service  
Spokane, WA**

